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Preface to Volume Twenty-Eight

A story from the Arabian Nights

I have read the whole of the Arabian Nights with great profit and pleasure in the " Second Calcutta " edited by Sir WILLIAM HAY MACNAGHTEN, and have read as well the supplementary stories which have been added from time to time by other editors (1). That collection of Oriental tales (Persian, Hindu,

(1) The Arabian Nights were revealed to the Western World (and printed for the first time) by ANTOINE GALLAND (12 vols., Paris 1704-11). The first Arabic edition (but only of the first 200 Nights) was the " first Calcutta " published a century later (2 vols. 1814-8); the first complete (or more complete) editions were the Breslau edition (12 vols., 1825-43) and the " first Bûlâq " (2 vols. 1835); then appeared the second (or complete) Calcutta edition (4 vols., 1839-42). The best Arabic editions are the two last named; the " first Bûlâq " and the " second Calcutta." DUNCAN BLACK MACDONALD has investigated the MSS. and paved the way for a critical edition the preparation of which is being continued by one of his pupils, WILLIAM THOMSON. The best known translations are the English by WILLIAM LANE (in parts, 1839-41), JOHN PAYNE (13 vols, 1882-9), Sir RICHARD BURTON (16 vols., 1885-88), the French translation by J. C. MARDRUS (16 vols., 1899-1912) and the German one by ENNO LITTMANN (6 vols., 1921-8). This last-named is perhaps the best of all, but it is largely restricted to the text while LANE's and BURTON's translations contain an abundance of explanatory notes. For general orientation on the subject of the Arabian Nights see the articles by JOHANNES OESTRUP (*Encyclopaedia of Islâm*, vol. 1, 252-6, 1909) and by D. B. MACDONALD (*ibidem*, supplement, 17-21, 1934).

but overwhelmingly Arabic) is one of the most remarkable literary works that have come down to us from the Middle Ages, and the one which has enjoyed the widest popularity. It is the only mediaeval book which is read with the same eagerness as a modern one. To be sure some people read it badly, being animated by a prurient curiosity rather than by an intellectual one, but that is *their* mistake. The Nights include highly seasoned stories, and others which are smutty and contemptible, but such stories are found in books written by people of other countries and other times, not excepting our own. To be done with this aspect of the question, let me observe that the Nights contain two kinds of objectionable stories, those wherein descriptions are made which would be replaced in modern books by suggestions, the Arabs being closer to nature and preferring to call a spade a spade (these stories to my mind are *not* objectionable, " honi soit qui mal y pense "), and in the second place those the lewdness of which cannot be denied, the product of disordered brains, needing more and more spice to obtain the titillations for which they crave. These stories of the second kind are truly objectionable, and the Nights would be a good deal better without them, but it is too late to change them and we must take them as they are. No true scholar can be satisfied with expurgated editions, for he cannot trust other men, however well-meaning, to decide for him what is good and significant, and what is not.

My beloved murshid, the Rev. Dr. DUNCAN BLACK MACDONALD never ceased to recommend to would-be missionaries to the Arabic countries to study the *Alf laila wa laila* (or Thousand and One Nights, as the stories are called in Arabic), as one of the best means of understanding those people and their background as well as an excellent linguistic exercise. I do not know to what extent the missionaries followed his advice, but I took it to heart, and studied the Nights very thoroughly. I am very grateful to him for that particular recommendation among many others.

A reading of the Nights is even more indispensable for the history of mediaeval science and culture than for the history of religion or for missionary enterprise. That work is a treasure of facts for the study of Arabic manners and customs, and in addition

it contains a wealth of information on Arabic lore and teaching and on the superstitions which were diffused among different classes of people throughout the immense and international Dârulislâm of mediaeval times. During my reading of the *Alf laila wa laila* I have accumulated a good many notes on science and education, and I hope to find enough leisure someday to analyze, integrate and publish them.

Many of the stories told in the Nights, though they are placed in an Arabic background, transcend their surroundings and are of universal application. Indeed the Arabs have essentially the same passions as other men, they exhibit in various degrees the same qualities and the same vices as ours, and we find among them the very types which are represented, however differently, in the masterpieces of the world literature. Some Arabic stories have in common with our folk tales, elements of ghastliness and frightfulness—crimes and tortures, ogres or ghîlân (aghwâl), devils or 'afârît, etc.—which outrage modern sensibility. These " atrocities " would probably bear similar explanations in every case. One clear symptom of progress is the increasing value set upon life and freedom, the gradual diminution of cruelty even in the case of lawful punishments (2). During the Middle Ages, whether in Christendom or Islâm, life was very insecure and was held much cheaper than it is now, abusive treatment of prisoners and of the weak was far more common, being the rule rather than the exception, and was more readily accepted by all concerned, including the victims (the latter would retaliate gladly enough with additional refinements of ferocity if the wheel of fortune made a new turn and the positions of tormentors and tormented were exchanged). It may be also that the atrocities, such as those which mar our nursery tales, had a prophylactic value; they served to warn the tender and trustful heart of children that the outside world was hostile, wicked and cruel, and that great prudence was required in order to eschew its dangers.

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(2) " Cruel and unusual punishments " were forbidden by the English Bill of Rights of 1689.

To my mind the most terrible of the Arabian tales occurs in the account of SINDIBÂD the Sailor's fourth voyage. These voyages (seven in number) represent one of the older parts of the treasure, their account being based on a nucleus of facts brought to the attention of the citizens of Baghdâd and other civilized towns by Muslim travellers of the ninth century, such as SULAIMÂN the Merchant and IBN WAHB (3). To be sure the same facts were repeated with many variants and with other yarns by later cosmographers such as AL-QAZWÎNÎ (d. 1283) and IBN AL-WARDÎ (d. 1349), but there are good reasons for believing that the SINBIDÂD cycle (4) was constituted relatively early.

Commentators, such as LANE, have tried to identify some of the places mentioned in those stories, but their identifications, though plausible, are seldom convincing. The truth is that the ignorant story-tellers had no intention whatsoever of localizing their tales, or of determining the events in any other way, a " rukhkh " might be any gigantic bird of prey, and the fabulous islands visited by SINDIBÂD of the Sea, any islands lost in the mysterious and unlimited Ocean. In the case of folktales one can never expect more than loose reminiscences such as might flash through the memory of old men having suffered endless vicissitudes without having ever been able to analyze them very clearly; or worse still, they do not offer us direct reminiscences, but very indirect ones, being the fruits of ancient oral traditions which have contaminated one another in diverse manners.

* * *

The story I referred to is told during the five hundred and fifty-first night (according to the Second Calcutta, vol. 3, 40-41); I reproduce LANE's version (vol. 3, 36-37). SINDIBÂD and his companions have been shipwrecked as usual, and some of them have managed to reach a strange island.

(3) SARTON : *Introduction* (1, 571; 2, 868-70).

(4) Not to be confused with the SINDIBÂD-NÂME—SYNTIPAS, history of the seven (or ten) viziers—another cycle of stories of immense popularity, East and West, and eventually absorbed into the *Alf laila wa laila*. See note by Baron CARRA DE VAUX in *Encyclopaedia of Islâm* (vol. 4, 435, 1927). The *Sindibâd-nâme* is also of ancient origin, probably Sanskrit.

"We walked along the shores of that island, and found upon it abundant herbs; so we ate some of them to stay our departing spirits, and to sustain us; and passed the next night upon the shore of the island. And when the morning came, and diffused its light and shone, we arose and walked about the island to the right and left, and there appeared to us a building in the distance. We therefore proceeded over the island in the direction of that building which we had seen from a distance, and ceased not to proceed until we stood at its door. And while we were standing there, lo, there came forth to us from that door a party of naked men, who, without speaking to us, seized us, and took us to their King, and he commanded us to sit. So we sat; and they brought to us some food, such as we knew not, nor in our lives had we seen the like of it; wherefore my stomach consented not to it, and I ate none of it in comparison with my companions, and my eating so little of it was owing to the grace of God (whose name be exalted !), in consequence of which I have lived to the present time. For when my companions ate of that food, their minds became stupified, and they ate like madmen, and their states became changed. Then the people brought to them cocoanut-oil, and gave them to drink of it, and anointed them with it; and when my companions drank of that oil, their eyes became turned in their faces, and they proceeded to eat of that food contrary to their usual manner. Upon this, therefore, I was confounded respecting their case, and grieved for them, and became extremely anxious by reason of the violence of my fear for myself with regard to these naked men. I observed them attentively and, lo, they were a Magian people, and the King of their city was a ghool, and every one who arrived at their country, or whom they saw or met in the valley or the roads, they brought to their King, and they fed him with that food, and anointed him with that oil, in consequence of which his body became expanded, in order that he might eat largely; and his mind was stupified, his faculty of reflection was destroyed, and he became like an idiot. They gave him to eat and drink in abundance of that food and oil, until he became fat and stout, when they slaughtered him and roasted him, and served him as meat to their King. But as to the companions of the King, they ate the flesh of men without roasting or otherwise cooking it. So when I saw them do thus, I was in the utmost anguish on my own account and on account of my companions. The latter, by reason of the excessive stupefaction of their minds, knew not what was done unto them, and people committed them to a person who took them every day and went forth to pasture them on that island like cattle." (5)

Could anything more ghoulish be imagined? It is not the killing of those men which terrifies us, for we are all destined to die sooner or later, not even the ugly disposal of their remains,

(5) The cannibals who fatten their prisoners were supposed to be people of the Andaman Islands (in the Bay of Bengal), but LANE placed them in Sumatra, where the method of "stupefaction" described in this tale is said to have been actually used. As I remarked above, these localizations are hardly more than plausibilities and not very important. It is a question whether Sumatra was visited by the early Arabic sailors (or say, before the thirteenth century) and whether it can be identified with the Rami of AL-IDRĪSĪ, the Ramni of AL-QAZWĪNĪ, etc. See PH. S. VAN RONKEL : Sumatra (*Encyclopaedia of Islâm*, vol. 4, 551-2), 1927).

for after all it cannot make a great difference to a corpse whether it is eaten by worms, vultures, jackals or cannibals. No, the thing which makes one shudder is the *method* of those savages who stupefy their victims and thus degrade them from the status of individuals into a cattle-like condition.

* * *

That terrible story has often come back to my mind in recent years, occasionally with the dramatic intensity of a nightmare, because of the efforts made in various " civilized " countries, not only to regulate the activities of the people in all their ramifications and variegations, but to hold an exclusive sway over their hearts and souls, to control their every thought and dream, even their religion; in short to enslave them and to reduce them from the condition of disciplined but free individuals to that of mere cells of a larger and fiendish creature, the State personified by its Leader.

That process of gradual debasement has been carried so far that there are already a good many individuals (or should we say, late individuals?) who have reached the very bottom of slavery. That is, they are no longer coerced slaves, but domesticated ones, finding happiness and joy in their own abjection, ready to kiss the feet of their master and to die for him in blind obedience, without the possibility of knowing the circumstances and the true reasons of his orders and of their own sacrifices, nay, without the very desire to know them.

Indeed the degradation is so complete that the Leader can give himself the sardonic pleasure of congratulating his subjects for their " superior intelligence," by which is meant the mystical abandonment of their personalities to his will. Should some of these degraded creatures read this they would not be able to understand, and therefore, it is not for them that I am writing but only for people who have preserved their integrity, or who are heroically fighting to preserve it.

The whole dignity of man rests in his individual conscience, which must remain his ultimate guide and the light of his life, or else he almost ceases to be a human being and becomes like a head of cattle or an ant.

The progress of mankind as illustrated by the history of thought, and more particularly by the history of science, can be described as a development of the human conscience. (6) That conscience develops in many ways, the most effective being due to the desire to know the truth as completely and precisely as possible. Under the stimulus of that persistent and unsatiable desire man has gradually created instruments and methods which enable him better to reach his goal. In proportion as the circumstances of a situation are more exactly known, man's will with regard to it is enlightened and his conduct may become rational and purposive instead of remaining blind and haphazard; or to express the same idea in ethical terms, he becomes responsible. Indeed man's responsibility increases with his privileges, the greatest of which is the ability to obtain pertinent information, that is, objective, verifiable and perfectible knowledge on the problems submitted to solution and decision. Conscience and responsibility imply spiritual freedom; they are meaningless without it.

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No social life is possible without discipline, a discipline which becomes more detailed and more exacting as the social life is more complex. A good part of that discipline is regulated from without, for this is far more convenient, yet the best part of it will always be self-imposed, that is, dependent upon the reactions of each and every single conscience. Thus even when we deal with discipline and coercion, we are always coming back to conscience and freedom.

The good citizen, as I conceive him, is sufficiently disciplined to obey eagerly the laws and regulations of his community, and above all the dictates of his own religion and of his own conscience. Such a one may be rich or poor, strong or weak, literate or not, his value as a man rests in his individuality, in the fact that he is not satisfied to be simply a cog in a machine, but is anxious to use his mind and his will, whether he be able to follow his own initiatives or be obliged to follow another's and obey. To

(6) For the early history, and the definition of that idea see JAMES BREASTED (1865-1935): *The dawn of conscience* (New York 1933; *Isis* 21, 305-16).

be sure his intelligence may be defective and his information insufficient and he should be ready to consult others more alert or better informed; he can do this without loss of self-respect, for every intelligence is limited, not excluding that of dictators.

How I like the sturdy peasant or craftsman who realizes his limitations, yet is fully conscious of his responsibility and of his duties. Such a man, if he have any wisdom, is well aware that men are very unequal, and that they are unequal in many ways,—yet each has individual responsibilities, religious ones, social ones, political ones, and to take all these from him is the same as killing him or worse.

How I like that humble Bedouin who when he was visiting a great fair where thousands of his brethren were gathered together and where their combined emotions might so easily submerge his own (though he would not have put it that way, and was hardly conscious of anything except the physical pressure of the crowd) put a feather in his cap and from time to time he would touch it and reassure himself that he was not lost!

That rustic tale may serve as a symbol of what I have in mind. For to that simple Bedouin, to be lost did not mean not to find his way (that hardly mattered), but to cease to be conscious of himself. I wish more " civilized " men would put a feather in their caps, touch it from time to time, and make sure that they are men, not sheep. The most precious treasure of any man is his personality, his own unique and irreplaceable self. That personality is expressed in terms of individual ideas, emotions and desires, of individual responsibilities and individual duties. The whole of this is called conscience. Destroy the responsibilities, the duties, and you destroy the conscience, the " raison d'être " of his life.

He who assumes the immense responsibility of guiding a whole nation deserves the respect and obedience of its members if he respects their personalities and enables them to appreciate his decisions and to share to some extent his responsibilities as well as his duties. On the contrary, should he take their implicit obedience too much for granted and attempt to abuse it by blinding and fooling them, he would forfeit their confidence and their respect, and they should rebel against him. Indeed such servitude, such prostitution, is due to no man however

good he may happen to be (but a good man would not dream of exacting it), and whoever tried to enforce it should be challenged and driven to the wall.

The tyrant who enslaves his brethren and sisters so-to-say for their own benefit (as if there were any man good enough for that) proves ipso facto his own cheapness and baseness. He who places himself so much above the law is an outlaw and should be treated as such. He should be challenged and suppressed before his having injured multitudes of men irremediably.

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We do not know what was the nature of the stuepfying food which was given to the shipwrecked sailors, SINDIBÂD's companions, but the food distributed to the subject people of totalitarian states is named " propaganda," the extensive and exclusive diffusion of one-sided news (the French call it " bourrage de crâne ") by the press, the wireless and by every other conceivable means, fair or not. Such food does not fatten the body, as in the Arabian story, but it gradually stupefies the mind and undermines the individual conscience. The victims will not be eaten by cannibals; they are saved, and even encouraged to multiply, for butchery on the battlefield and for all the miseries and ignominies of war.

The history of many nations seems to prove that a dictatorial government is often very efficient, especially with regard to martial preparations and to war itself. Dictators may lead their well-disciplined armies to victory but they cannot hold their gains very long. At the end of the Napoleonic epos, in spite of her prodigious heroism France was not stronger and larger than before, but smaller and weaker, poorer in men and treasure, dispirited and dejected.

Is mankind unable to profit from past errors or must it repeat them on a larger and bloodier scale?

Westover, North East Harbor, Maine.
July 6, 1937. GEORGE SARTON.

L'histoire de la Terre Neuve du Peru

A Translation by Jacques Gohory

In 1545 there was published in Paris a pamphlet of fifty-six leaves which bore the following title : *L'histoire de la TERRE NEVVE DV Perù en l'Inde Occidentale, qui est la principale mine d'or du monde, nagueres descouuerte, & conquise, & nommée la nouuelle Castille* (1). This little treatise is the first important account in French of the conquest of Peru by FRANCISCO PIZARRO (1531-1533) (2). The French account, published anonymously, was the translation of an Italian work, also anonymous, which was itself the translation of an anonymous Spanish original first published in 1534. It is the purpose of the present article to discuss the identity of the French translator and to describe the work briefly.

The Italian work from which the French translation was made was printed at Venice in 1534 under the title of *Libro Ultimo del summario delle Indie Occidentali* (3). It was the third volume of a series entitled *Summario de la generale historia de l'Indie Occidentali* (4).

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(1) Imprimé à Paris, par PIERRE GAULTIER, pour IEHAN BARBÉ et VINCENT SERTENAS, 1545. Copies of this rare book are in the Bibliothèque Nationale, the John Carter Brown Library in Providence, and the New York Public Library.

(2) Mention is made of Peru in a translation from P. MARTIRE D'ANGHIERA, *Extraict ou Recueil des Isles nouvellement trouvées en la grand mer Oceane* (Paris, SIMON DE COLINES, 1533). There was also a translation of a letter of HERNANDO PIZARRO to the Audiencia Real at Sancto Domingo, of which the French title is : *Nouuelles certaines des Isles du Peru* (Lyon, FRANÇOYS JUSTE, 1534).

(3) Venice, October, 1534. See the following note.

(4) The entire series was published in 1534, at Venice. According to ALEXANDER POGO, whose article entitled "The Anonymous La Conquista del Peru and the Libro Ultimo del Summario delle Indie Occidentali", in the *Proceedings of the American Academy of Arts and Sciences*, Vol. LXIV, no. 8 (Boston, July, 1930) has served as my starting point, the printer was probably NICOLO D'ARISTOTILE, detto ZOPPINO (*op. cit.*, pp. 195-197).

These Italian works were translations of earlier Spanish accounts. The first volume was taken from PIETRO MARTIRE(5); the second was a translation of OVIEDO's *Dela natural hystoria delas Indias* (6); the third and last was the Italian version, with certain additions, of an anonymous *La conquista del Peru. llamada la nueva Castilla*, which was first published at Seville in April, 1534 (7). It is this last-named work which was the original of the French *Histoire du Peru*.

The Spanish chronicle, which is the earliest important printed account of the first part of the conquest of Peru, was written by one of PIZARRO's soldiers, although formerly it was thought to have been written by OVIEDO (8). Other authorities had assigned it to XEREZ, the author of another account published later in the same year (9). But ALEXANDER POGO has decisively proved that the author of *La conquista del Peru* was neither OVIEDO, XEREZ, nor ESTETE (10).

"The anonymous *La conquista del Peru*," says POGO, "is not only the earliest known detailed chronicle of the conquest; it has the advantage of not being an official report... it can be considered as a non-retouched picture... The anonymous author was one of the twenty-five compañeros who asked permission

(5) POGO, *op. cit.*, p. 195.

(6) *Ibid.*, pp. 195-196.

(7) *Ibid.*, pp. 192-193, 197. There are only two known copies of this Spanish work, sometimes known as the "New York Public Library Chronicle"; one is in the New York Public Library, and the other is in the British Museum. POGO's edition has made this valuable work available to students of the early history of the Americas. An English translation of the chronicle was published by JOSEPH H. SINCLAIR under the title of *The Conquest of Peru as recorded by a member of the Pizarro expedition* (New York, 1929). SINCLAIR's book was reviewed by A. POGO in *Isis*, XIV (Bruges, May, 1930), 244-250. The SINCLAIR publication contains a facsimile of the original *La conquista*.

(8) This belief was held by so recent a bibliographer as ATKINSON in his *Littérature géographique de la Renaissance* (Paris, 1927), p. 71. Cf. J. R. BARTLETT, *Catalogue of Books relating to North and South America in the John Carter Brown Library* (Providence, 1875), I, 139.

(9) ERNEST HAMY, "Un Précurseur de Guy de la Brosse—Jacques Gohory et le Lycium philosophal de Saint-Marceau-lès-Paris", in Muséum d'histoire naturelle : *Nouvelles Archives*, série 4, tome I (Paris, 1899), p. 8; GEORGE A. DORSEY, "A Bibliography of the Anthropology of Peru", Field Columbian Museum: *Anthropological series*, vol. II, no. 2 (Chicago, 1898), pp. 203-204. Cf. POGO, *La conquista*, p. 193 *et passim*.

(10) POGO, *op. cit.*, pp. 180-185.

to return home immediately after the distribution of Atahuallpa's ransom : it is probable that he arrived at the 'rio de Sevilla' on board the 'Santa Maria del Campo,' on January 9, 1534, in time to complete his chronicle and have it printed in April." (11)

In October, 1534, was published the *Libro Ultimo*, from which the *Histoire de la Terre Nevve du Peru* was translated eleven years later. The Italian translator followed *La conquista del Peru* quite faithfully, but he added to the matter translated certain portions of the accounts of XEREZ and ESTETE (12). He also connected the *Libro Ultimo* with the previous volume of the series known as the *Summario de la generale historia*, the *Libro Secondo*. In all, the material added made up about one third of the book (13). Apparently the Italian form of the chronicle was popular, for it was reprinted in 1535 (14). It was one of these editions which was the source of the French translation.

II

Of the French version of *La conquista del Peru* POGO writes as follows :

> The French translation was made—as shown by its title—from the Italian version. The translator, whose initials were I. G., has been tentatively identified with JACQUES GOHORY or with JEAN DE GORRIS (GORRAEUS); it is possible that one of them made the translation. The French translation follows the Italian text... closely, but does not hesitate to become occasionally free... The literary style of I.G. is charming, and his tendency to exaggerate is as amusing as his efforts to avoid references to the Cesarea Maiesta of CHARLES V. (15)

I shall endeavor to prove in the following paragraphs that the editor of the *Histoire du Peru* was undoubtedly JACQUES GOHORY, the first French translator of MACHIAVELLI, a translator of part of the *Amadis de Gaula*, poet, historian, and alchemist (16).

(11) *Ibid.*, pp. 183-184.

(12) *Ibid.*, p. 186.

(13) *Loc. cit.*

(14) *Ibid.*, pp. 187, 199-200. The 1535 edition was published in Rome. Cf. SINCLAIR, *op. cit.*, p. 46.

(15) POGO, *op. cit.*, p. 187. JEAN DE GORRIS was a Paris physician who translated a few medical works. He lived in the middle of the sixteenth century.

(16) JACQUES GOHORY was born in Paris in 1520. A member of the legal aristocracy, he was long associated with the Parlement of Paris. He served with

Other writers besides POGO have been hesitant in attributing the *Histoire du Peru* to JACQUES GOHORY, because the translator signed his preface only with the initials I. G. (17). There is, however, further evidence to prove that GOHORY was the translator of the *Libro Ultimo*, although nowhere does he refer to this translation in his other writings.

At the beginning of the book there is a dedicatory epistle, addressed "A Messire A. de M. C. & G. M. de F." The dedication commences in the following manner :

> Depuis l'estat de ma servitude nouvelle à vous seul vouée et dediée, toutes mes œuvres soient fabriles ou industrielles sont tellement affectées à vostre seigneurie qu'il ne pourroit plus rien sortir de moy qui ne fust vostre. Ce livre se tiendra bien heureux d'estre du nombre, lequel m'est quasi eschapé, et né en peu de jours comme nature imparfaite et avortée pendant que la besongne principale que m'avez commandée, tend à maturité achevant ses neuf moys. (18)

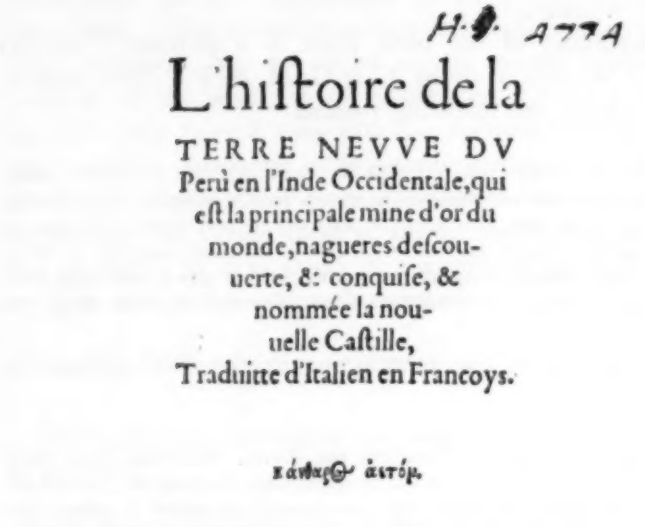
As it appears from the manuscript in the Bibliothèque de

French ambassadors in England, Flanders, and Rome. Returning from Rome in 1556, for a number of years he lived in retirement, studying the natural and occult sciences, including alchemy. He was greatly interested in plants, and about 1572 he established on the outskirts of Paris an experimental laboratory and botanical garden, one of the first of its kind. The last three years of his life were spent as a royal historiographer. He died in Paris in 1576. His most important writings are his translations of the *Amadís* and of MACHIAVELLI, his French and Latin poems, a delightful work on wine entitled *Devis sur la vigne*, and a compendium of the works of PARACELSUS. For more detailed information concerning GOHORY, see ERNEST HAMY, *Jacques Gohory*, the article mentioned above, and my Harvard thesis on GOHORY.

(17) DU VERDIER, in the *Bibliothèque françoise* of LA CROIX DU MAINE et DU VERDIER (Paris, 1772), IV, 280, gives the *Histoire du Peru* as one of GOHORY's works, but incorrectly dates it 1553. He was followed in this by the *Nouvelle Biographie générale*, XXI, 83; by BARCIA-PINELO, *Epitome* (Madrid, 1738), vol. II, col. 645; and by MORÉRI, *Le Grand Dictionnaire historique* (Paris, 1759), V, 251. MORÉRI was probably the first to confuse JACQUES GOHORY with JEAN DE GORRIS. Among more recent authorities, TERNAUX-COMPANS, *Bibliothèque Américaine* (Paris, 1837), p. 11, does not mention the name of the French translator; SINCLAIR, *op. cit.*, p. 46, says : "possibly translated by JACQUES GOHORRY"; G. ATKINSON, *loc. cit.*, has "JEAN GOHORRY"; others, including the *Catalogue* of the British Museum (London, 1887), XXXVIII, 47, list the translation as the work of an anonymous I. G. JOSEPH SABIN's *A Dictionary of Books relating to America* (New York and London, 1881), XIV, 98, lists the work under I. G.; H. HARISSE's *Bibliotheca Americana Vetustissima* (New York, 1866), p. 410, has "JACQUES GOHORY or JEAN DE GORRIS."

(18) GOHORY, *Histoire du Peru*, fol. Aij.

l'Institut (19), GOHORY began in 1544 the translation of a part of LIVY's *Historiae Romanae*; but the work was not published until 1548 (20). In a preface to the printed edition are to be found the following words : "Je confesseray l'avoir fait... pour


H·9· 2774

L'hiſtoire de la

TERRE NEVVE DV
Perù en l'Inde Occidentale, qui
eſt la principale mine d'or du
monde, nagueres deſcou-
uerte, & conquiſe, &
nommée la nou-
uelle Caſtille,
Traduitte d'Italien en Francoys.

κάπαρ ἀιτόμ.

On les vend à Paris au Palais en la Galerie
par ou on va à la Chancellerie en la
boutique de Vincent Sertenas.
1 5 4 5 .

AVEC PRIVILEGE.

FIG. 1.

obeir au commandement de Monseigneur le Connestable" (21). The "besongne principale que m'avez commandée" undoubtedly

(19) Bibl. de l'Institut, Ms. no. 677.

(20) It was published first at Paris, ARNOULT L'ANGELIER, 1548; a second edition appeared at Lyons, BALTHAZAR ARNOULLET, 1553. GOHORY's translation went only through the Second Book of the first Decade.

(21) GOHORY, *Le Premier et Second Livres de la premiere Decade de Tite Live de Padoue, depuis la fondation de Rome*, Lyons edition, preface, fol. aa2. The preface is dated January 20, 1548.

refers to the translation of LIVY for the connétable which GOHORY had begun but not completed at the time the *Histoire du Peru* was published. The initials "A. de M. C. & G. M. de F." signify, it is clear, "Anne de Montmorency, Connestable et Grand Maistre de France." Since GOHORY's name is signed to the translation of LIVY, there is no reason to doubt that he was also the translator of the *Libro Ultimo*, the Italian version of the Spanish *La conquista del Peru* (22).

III

The dedicatory epistle continues with a mention of the gold described in the *Histoire du Peru* (23). GOHORY regarded this translation as a work of relaxation from his more arduous duties. He tells his patron, ANNE DE MONTMORENCY, that the gold which the book contains has not stuck to his fingers while he was writing about it; neither will it enrich the connétable, who is already a man of considerable means (24).

The part of the book which follows the dedication is a short, well-written preface in which JACQUES GOHORY reveals his own ideas concerning the discoveries in the New World. He says that he is especially fond of reading books which tell of voyages to unknown lands. The preface is interesting, for from it one learns "de façon certaine le genre d'intérêt que prenaient les Français de ce temps aux récits de voyage" (25). As CHINARD says : "l'éditeur français a pris soin en effet de nous renseigner sur les causes qui rendaient les récits de voyages si attrayants pour les contemporains" (26). GOHORY's preface begins as follows :

> Entre tous les livres de plaisir spirituel et honneste je n'en trouve point de plus recreative contemplation que ceux qui traittent les histoires des terres neuves, et les conquestes des pays loingtains et estranges. Entre lesquelz le Perù (qui a esté le dernier descouvert du nouveau monde) sans controverse emporte le

(22) *Loc. cit.* See also Bibl. de l'Institut, Ms. no. 677, fol. 2.

(23) The full title contains the words "la principale mine d'or du monde."

(24) GOHORY, *Peru*, dedicatory epistle, fol. Aij-Aij v°.

(25) G. CHINARD, *L'Exotisme américain dans la littérature française au XVI^e siècle* (Paris, 1914), p. 23.

(26) *Loc. cit.*

pris en toute admiration de singularitez, et richesses. Ma raison est que telz livres sont pleins d'un plaisant discours de terres et mers incongneues, d'hommes, bestes et plantes d'estrange maniere : en quoy l'esperit se paist d'une volupté et delectation naturelle de nouveauté, le jugement commun se forme et instruit de congnoissance nouvelle, et l'imagination esclaircit son incertitude par asseurance oculaire des choses si merveilleuses, ou par le rapport d'autruy loyal et veritable. (27)

The new discoveries have changed the ideas of all educated men concerning the world as it was known by the ancients. Our world is no longer, says GOHORY, the limited one they knew (28). GOHORY believes that the reader will be able to find profit as well as delight in learning of the people on the other side of the world, who live so differently from him. But GOHORY does not regard the civilization of the Incas as superior or even equal to that of Europe. In fact, he has a rather low opinion of the savages of Peru, whom he considers to be half-way between civilized men and animals (29). He expresses his thoughts in the following words :

Ce livre en premiere apparence semble promettre plus de passetemps que de fruit. Mais au fond les esperitz parfaitz contempleront que cest que de l'humaine nature rude et sauvage sans loix ne police vivant brutalement par les boys et montagnes. Et de combien la passent ceux qui sont reduitz es villes et bourgades regies et gouvernées par ordre et institution civile, telz que verrez estre icy les Indoys dont ceste histoire est escritte. Lesquelz toutesfois n'ont les esperitz stilez et faconnez en tant d'exercices et usages divers que les nostres; ains tiennent quasi une moyenne nature entre les hommes et les bestes, n'estans duitz ny apriz es artz de paix et de guerre, comme sont les peuples des trois autres parties du monde habitable (30).

If the Indians of Peru had had the intelligence of the Spaniards, they could not have been conquered by a mere handful of soldiers in such a short time. GOHORY seems here to show that he followed MACHIAVELLI in his praise of skillful strategy. He believes that without intelligence life is worth little. He continues :

Comme penserez vous qu'il ayt esté possible selon la teneur de ceste histoire à une centaine de gens... conquerir un si grand pays en si peu de temps?...

(27) GOHORY, *op. cit.*, fol. Aiij.

(28) *Ibid.*, fol. Aiij-Aiij v°.

(29) M. CHINARD shows that the idea of the "noble savage" originated in the sixteenth century but finds no trace of the conception as a dominant one before MONTAIGNE. CHINARD, *op. cit.*, p. xvi *et passim*.

(30) *Ibid.*, fol. Aiij v°. Cf. CHINARD, *op. cit.*, p. 24.

En cela ce congnoist comme peu vault en nous ceste particule immortelle de feu celeste, source et motif de toute vie et congnoissance, qui ne l'aguyseroit et mettroit en œuvre... (31)

COPY OF A MAP MADE IN PARIS IN 1545
TO ILLUSTRATE THE FRENCH TRANSLATION OF
LA CONQUISTA DEL PERU

FIG. 2.

The French translator gives unstinted praise to the Spaniards who discovered and conquered the new lands across the Atlantic :

(31) GOHORY, *Peru, loc. cit.*

Quant à noz preux et magnanimes argonautes, ilz ne sont à defrauder de leur deue louenge. A laquelle l'Europe universelle leur est à perpetuité obligée en recompense de leurs incroyables labeurs, et espouventables entreprinses. O gentil VESPUCE, ô hardy COLUMBE, vaillant PIZZARRE, quelle langue fournira aux panigeriques de voz hauz courages, de voz esperitz divins? (32)

Toward the end of this preface is found the expression of GOHORY's disdain for wealth, "ce dédain des richesses qui sera l'un de ses traits les plus accentués" (33). The reader, says GOHORY, will find delight in the description of the gold found in Peru :

Or si d'avanture ce livre des entreprinses marines tumbe es mains du commun ou il ayt qui pregne peine de le lire. Il me convient demander s'il se trouvera plaisant et delectable veu la matière qu'il traitte qu'on peult reclamer la plus riche et plus precieuse que la terre porte. Cest l'or, cest or auquel chacun tend, chacun vise, pour lequel nuyt et jour ce miserable monde vit en continuelle peine et tourment de corps et d'ame. Cest or lequel accompagné de l'argent n'a moindre auctorité ne puissance sur terre que le soleil et la lune ont au ciel. Or qui l'ayme si le monstre sachant qu'il est exposé en commun, et n'y à que manière de l'avoir, et si le chemin semble long, il est seur, et nul bien sans peine : Mais ceux qui tant plaindront leurs pas qu'ilz se contenteront d'en sentir l'odeur par escrit ilz n'en recevront le profit qu'en son et en painture. Pour conclusion celuy qui sera de si dure foy qu'il ne veuille croire les merveilles que j'en compte, si y aille veoir puis m'en desmente. (34)

I have already said that the *Histoire du Peru* closely follows the Italian version. GOHORY added marginal notes which serve to explain the action or to make clear certain Spanish expressions or to locate the places mentioned in the text. Furthermore, GOHORY had an acquaintance of his, NICOLAS DENISOT of Le Mans, better known as the Comte d'ALSINOYS (35), draw up a map of Peru, which was to accompany the book. Although this map is inaccurate according to modern ideas of geography, it is extremely interesting for itself (36). It is the first map of Peru made in France and is very rare (37).

(32) *Ibid.*, fol. Aiiij.

(33) HAMY, *Jacques Gohory*, p. 8.

(34) *Histoire du Peru*, fol. Aiiij v°. Cf. CHINARD, *loc. cit.*

(35) See CLEMENT JUGÉ, *Nicolas Denisot du Mans* (Paris, 1907).

(36) JUGÉ, *op. cit.*, p. ii, note 1; GABRIEL MARCEL, "Le Conte d'ALSINOYS géographe", in the *Revue de Géographie*, XXXV (Paris, 1894), pp. 193-198. MARCEL says (p. 197) : "DENISOT place Cuzco par 7° de latitude australe alors que cette ville gît par 13° 30′ à peu près."

(37) There is only one known copy of the *Histoire du Peru* which contains this map (Bibliothèque Nationale, Rés. o1 758); a pen-and-ink drawing of it is

The French translation of the account of the exploration and conquest of Peru begins with the departure of the PIZARRO brothers, FRANCISCO and HERNANDO, from Panama for the Moulouques Isles. The arrival at Caxamalca, the imprisonment and death of ATAHUALLPA, the division of the booty of gold and silver, and the return to Castille of twenty-five members of the expedition (including the Spanish narrator) are among the principal events related.

The account of the expedition begins in the following manner :

L'An mil cinq cens trente et un au moys de Fevrier nous embarquasmes au port de Panamà, et estions de compte fait deux cens cinquante hommes [illegible] pied et quatre vingtz de cheval, soub la conduicte du vaillant capitaine FRANCOYS PIZZARRE. Et navigasmes jusques au quinziesme jour, auquel nous prismes terre au cap S. Mathieu (ainsi nommé à present) ou courusmes environ cent lieues de pays non sans plusieurs belles conquestes des places tenues par les Indoys (38).

The arrival of Almagro is told as follows :

Estant donc le gouverneur en la ville de Caxamalca sans aucune esperance de secours, ja y avoit sejourné l'espace de 40 jours quand don Diego d'Almagro arriva accompagné de 150 Espagnolz, lequel estoit descendu en celle contrée pour aller peupler et garnir un vieil port de mer nommé Cancebi : mais adverty par nous de l'or infini que nous avions trouvé là comme loyal serviteur de l'empereur fut content de demourer en nostre ayde (39).

The death of ATAHUALLPA on August 29, 1533 is described in these words :

Si le menerent entre nuyt et jour en la rue, l'attacherent à un posteau ou ilz luy appareillerent beau feu pour le rostir par le commandement du gouverneur si dieu n'eust prins pitié de luy le convertissant à sa sainte foy. Car il dit lors qu'il avoit vouloir de devenir bon chrestien, dont luy fut la cruauté de la mort moderée, et le feu converty en l'eau (40).

The description of the homeward voyage and the arrival in Seville, which is not found in the histories of OVIEDO and XEREZ, is of rare charm :

A nous qui tendions en Castille, le gouverneur livra la part imperialle de la conqueste d'or. Depuis la province du Perù dont (nous partismes) jusques à la

found in the New York Public Library copy, which we reproduce from the SINCLAIR translation of *La conquista del Peru*. See SINCLAIR, p. 47, and POGO's review in *Isis*, XIV, 246.

(38) GOHORY, *Peru*, fol. Bij v°.

(39) *Ibid.*, fol. I.

(40) *Ibid.*, fol. N. Cf. WILLIAM H. PRESCOTT, *History of the Conquest of Peru* (New York, 1848), I, 486-487.

mer fismes 200 lieues de terre, et du lieu ou premierement nous embarcasmes en la mer du Su jusques au port de Panamà courusmes 15 jours entiers. Auquel port nous fut fait tresbon recueil non sans grande admiration de la quantité d'or que nous apportions... il convenoit conduyre [l'or] 80 mille par terre jusques en la ville du nom du Dieu, laquelle est assise sur l'autre mer du Nort en la routte d'Espagne, de ce port les ancres levez, feismes voyle vers l'isle Espagnolle... de là rafreschiz de vivres, et de toutes autres provisions necessaires pour entrer en la voye d'Espagne tournasmes prore à l'Est, et la tenant, tousjours entre Grec (41), et levant partasmes 52 jours et fismes 1350 lieues selon le calcule de noz pillotes, et beaucoup plus à mon advis, en fin de course abordasmes à sainct Luc de Barameda, qui est sur la riviere de Guadachibie de là ayans tousjours la mer calme arrivasmes en la cité de Sibylle ou toutes les nauz venans des Indes deschargent leurs marchandises... Nous prismes terre en la cité de Sibylle le quinziesme jour de Janvier 1534, la ou nous deschargeasmes nostre or et argent total, et fusmes receuz en plus grande admiration de tous... que nefz qui onques y feussent arrivées de tant loingtain voyage que ce fust. Chacun y accourut pour veoir à l'œil la merveille incroyable de nostre richesse qui ne pourroit jamais emporter foy de qui ne l'auroit veue. Chacun de nous chargé de sa porcion d'or se retira en sa maison ou nous fusmes recueilliz par les nostres en tęlle chere et liesse que par raison vous pouvez imaginer (42)

In putting the Italian *Libro Ultimo* into French, JACQUES GOHORY was performing an important service for his fellow-countrymen. The frequently-expressed aim of the numerous translators and popularizers of knowledge who flourished in the middle of the sixteenth century in France was to bring to a large number of readers new and interesting information presented in an easily understood form. Although the *Histoire du Peru* is a mere translation, it may rightly be considered a valuable contribution to the knowledge of the time. It was the first long account in French of the conquest of Peru; previous relations had been written only in Latin, Italian, or Spanish. Furthermore, it was, in the French version, presented in a readable and amusing style. For these reasons the book deserves to be better known than it has been.

University of Nebraska
Lincoln, Nebraska W. H. BOWEN

(41) GOHORY's marginal note is "vent Grec c'est ouest nordest."
(42) GOHORY, *Peru*, fols. O — Oij.

Notes on a Rechenbüchlein of Konrad Glaser (1)

Among the books and manuscripts of the Aaron Collection at the University of Illinois is a manuscript on commercial arithmetic written by KONRAD GLASER at Nürnberg in 1534. This manuscript (13 × 14.5 cms.) is written in a small 16th-century German hand and consists of 10 folios on vellum with a contemporary vellum binding.

Very little seems to be known concerning KONRAD GLASER. JOHANN NEUDÖRFER gives a short account of GLASER in *Schreib- und Rechenmeister zu Nürnberg, Nachrichten von Künstlern und Werkleuten daselbst aus dem Jahre* 1547 (2). This account states that KONRAD GLASER was originally a clergyman and first came to notice about 1522 during the Protestant Reformation. Somewhat later it seems that he lost his mind and in a rage threw his mother down the stairway and killed her. He also tried to kill a young man who lived with him, but the second victim escaped without injury. In 1529 the city authorities had him arrested and put into prison, but later released him in the custody of his fiancée, KATHARINA, on the payment of 600 florins caution money. Shortly after his release he was married to KATHARINA. NEUDÖRFER states that GLASER was one of the most brilliant teachers of arithmetic at Nürnberg up to this time. At his death in 1546 SEBALD's Necrology carried the following notice : " Herr Konrad Glaser, Rechenmeister zu St. Katharina."

The Archivdirektor, Dr. SCHAFFER, of the City of Nürnberg informs the present writer in a letter dated September 7, 1936

(1) The present writer wishes to take this opportunity to express his appreciation to the Director of the Library of the University of Illinois for his generous cooperation in allowing access to the above manuscript.

(2) Das JOHANN NEUDÖRFER, *Schreib- und Rechenmeister zu Nürnberg...*, edited by G. W. K. LOCHNER, in *Quellenschriften für Kunstgeschichte*, Vol. X (Wien, 1875), pp. 183-185.

that the only information in their archives concerning GLASER is as follows :

> Nach den Grundverbriefungsbüchern des Stadtgerichts kauften 1543 der Rechenmeister CUNRADT GLASER und seine Ehefrau KATHARINA einen Eigenzins von 5 fl. jährlich aus einer Ziegelhütte unterhalb Altdorfs bei Nürnberg.

The manuscript opens, Folio 1r, with a 10 × 10 multiplication table with " Spes Christvs Mea " above the table and " Cunradt Glaser Rechenmeist[er] zu Nürnberg 1534 " below. Folio 1v

Folio 6r of Glaser's Rechenbüchlein

gives two sets of sums, one set of 18 items in gold expressed in pfennigs, shillings, and florins; the second set is expressed in " Münz " or bullion. Folio 2r states the one and only rule in the manuscript, on proportion :

> Rule of proportion. When three numbers are given and the first and third are equal in denomination, we take the third number, multiply it by the middle one, and divide the result by the first. Thus we get the fourth, unknown, number.

This rule is followed on Folios 2r to 4v by a number of illustrative

examples on proportion of the following type : " Item—1 pound for 4 shillings 8 pfennigs—52 pounds for 26 florins 3 shillings 14 pfennigs." (1)

Folios 4^v to 5^v are taken up with a discussion " Of ducat and batzen calculations " and " On business companies." The examples given in these sections are of a simple type, showing the reduction of batzens and ducats to florins, shillings, and pfennigs, along with examples on partnership.

Beginning with the latter part of Folio 5^v and continuing to Folio 8^v we have items " Of all kinds of transactions." These items are concerned for the most part with the cost of different articles of commerce, with allowances of tare, and the cost of freighting these and other articles of commerce between cities and over given distances. The type is illustrated by the following example :

Item—45 kartels of silk weigh 419 pounds 18 lot 2 quentchen 2 pfennigs. 1 pound costs 1 florin 13 pfennigs ½; allowance for each kartel, 17 lot 2 quentchen 1 pfennig. Answer, 661 florins 8 shillings 7 pfennigs 173/256.

The next section on Folio 8^v is " Gold and silver calculations." The examples given here involve the calculation of the cost of gold and silver of varying degrees of fineness in terms of the prevailing currencies at that time. A typical example is the following :

One buys 124 marks 4 pfennigs 13 gran of silver at Lyons, allowance of 21 gran for 10 pfennigs, 1 mark costs 9 florin ort ½. He takes this to Nürnberg. The question is, how much of fine silver there is and for how much he should sell 1 mark so that he should gain 7 florins ½ net, if 100 marks at Lyons are 103 marks at Nürnberg and 12 pfennigs is 1 mark and 1 pfennig is 24 gran [?]. Answer, you have 116 marks 9 lot 3 quentchen 2 pfennigs ½ and 1 mark should be sold for 9 florins 9 shillings 7 pfennigs 39951/74635.

Folio 10^v gives a rather extensive table of weights and measures. The most important of these are recorded below, but not in the order given in the original manuscript :

(1) In the manuscript the symbols given later in this paper are used in every case for pounds (pfunds), shillings, pfennigs, marks, etc.

[Gold Money]

Item	20	ß [shillings]	1	fl [florin]
"	240	₰ [pfennigs]	1	fl
"	2	ß 6 ₰	½	ort or 1/8 fl

[Silver Money]

Item	1	fl	252	₰ [pfennige]
"	60	ʀ₰ [kreuzers]	1	fl
"	16	₰ 4/5	1	batzen
"	15	batzen	1	fl

[Weights Avoirdupois]

Item	100	℔ [pfund][1]	1	ℭ [centner]
"	32	lot[2]	1	℔
"	4	ℳß [quentchen]	1	lot
"	4	ʒ	1	ℳß

[Weights Troy]

Item	16	lot	1	ℳ [silver mark]
"	64	ℳß	1	ℳ
"	256	ʒ	1	ℳ [gold mark]
"	24	☉ [carats]	1	ℳ [gold mark]
"	4	gran	1	☉

(1) Pfund, the Nürnberg pfund of commerce was equivalent to 7,871 English grains. DOURSTHER, HORACE, *Dictionnaire universel des Poids et Mesures, anciens et modernes*, Bruxelles, 1840.

(2) Lot, an abbreviation for loth, the 32nd part of the pfund. The loth was also used to express the fineness of silver. Since the mark was the unit of weight of gold and silver and there were 16 loth to the mark, the fineness of silver was expressed in 16th. DOURSTHER, *Dictionnaire*.

[Measures]

Item	60	pieces	1 schock (1)
,,	180	schock	1 stück
,,	64	mass (2)	1 eimer (3)
,,	99	mass	1 tun
,,	12	eimer	1 fuder (4)
,,	32	ellen (5)	1 tuck [bolt cloth]
,,	22	tuck	1 saum [bale cloth]
,,	45	bartchet (6)	1 fardel
,,	16	massel (7)	1 sack corn
,,	32	massel	1 sack oats

An examination of the manuscript will reveal several interesting facts, such as the use of unit fractions, a method of writing fractions whose denominators are 2, and the price of various commodities in terms of the present day value of gold. On Folio 4^{v} we have the following item : "Item—37 ellen $\frac{1}{2}$ for 26 florins $\frac{1}{2}\ \frac{1}{3}\ \frac{1}{4}\ \frac{1}{6}$, 12 ellen for 9 florins 0 shillings 21 pfennigs [gold]." In this case, as the proportion shows, 26 florins $\frac{1}{2}\ \frac{1}{3}\ \frac{1}{4}\ \frac{1}{6}$ equals $26 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{6}$ or $27\frac{1}{4}$ florins. Again on Folio 3^{r} we have : " Item—1 elle of velvet for 1 florin 18 shillings, how much for half third half [?] Answer, 3 shillings

(1) Schock is probably derived from the Babylonian schuschu meaning 60. MURET-SANDERS, *Enzyklopädisches Wörterbuch.*

(2) Mass was generally used in Germany as a measure of grains, but in Nürnberg it was also used for liquids, equivalent to about 2.188 English pints. DOURSTHER, *Dictionnaire.*

(3) Eimer, a measure of liquids, equivalent to about 15.2 English gallons. DOURSTHER, *Dictionnaire.*

(4) Fuder, a measure of liquids, equivalent to about 182.4 English gallons. DOURSTHER, *Dictionnaire.*

(5) Elle, a measure of cloth. In Nürnberg equivalent to about 25.845 inches. DOURSTER, *Dictionnaire.*

(6) Barchet, a word used in many German cities to designate 22 to 24 ellen of cloth. DOURSTHER, *Dictionnaire.*

(7) Massel, a measure of capacity used in the measurement of grains; it was equivalent to about 8.157 English pints. DOURSTHER, *Dictionnaire.*

2 pfennigs [gold]." Checking this proportion, it is obvious that the unit fraction in this case expresses the operation of multiplication; that is, half third half equals $\frac{1}{2} \cdot \frac{1}{3} \cdot \frac{1}{2}$ or $\frac{1}{12}$. From the examples given in the text it appears that the unit fraction is used to express two different operations: when the fractions are written in numerical form, as $\frac{1}{2}\ \frac{1}{3}\ \frac{1}{4}\ \frac{1}{6}$ addition is implied; secondly, when the fractions are written out, as halb dritter halb, multiplication is implied. It should be noted that in all the cases given above for writing denominate numbers the integer is written, then the word, symbol, or abbreviation for the denomination, followed by the fractional part of the denomination: for example, in the first illustration above we have 37 ellen $\frac{1}{2}$ for $37\frac{1}{2}$ ellen.

On Folios 8r to 10 v we find an unusual method of writing fractions whose denominators are 2. In this method we have the following characters representing the given fractions: ʒ = $\frac{1}{2}$, ⁘ʒ = $\frac{3}{2}$, ⁖ʒ = $\frac{5}{2}$, and ⁙ʒ = $\frac{7}{2}$. The symbol for $\frac{1}{2}$ is without doubt the German script " z "; for $\frac{3}{2}$ we have the " z " with an additional curve added and two dots above; and so on as shown for the other fractions. Apparently the initial letter for 2 is used for $\frac{1}{2}$, while the numerators for the other fractions are determined by adding the number of dots and curves on the " z." The methods of writing fractions given above are not used in every case throughout the manuscript, but are variations from the usual methods.

Although the monetary situation in Germany at this time was in utter confusion, we should be able to compute the value of the florin and a few commodities in terms of the present day value of gold with respect to the dollar. (1) Of course, this

(1) For a short discussion of the monetary situation in Germany at this time, see SHAW, W. A., *The History of Currency* 1252 *to* 1894, London, 1895, pp. 95-99.

will necessitate the assumption that GLASER was correct in giving the price paid per unit of gold. Such an assumption, however, seems valid, since the prices given vary only slightly from one another. On Folios 8^v to 9^r the average price paid for pure gold per carat was 3 florins 17 shillings 7 pfennigs. According to DOURSTHER (1) the carat at Nürnberg contained 236.75 English grains, and at $ 35.00 per ounce of 480 grains the florin would have a gold value of $ 4.45. Again it might be well to compare the price of gold with that of silver. On the same Folios we find the average price paid for a mark of silver, 5,682 English grains, was 8 florins 8 shillings 4 pfennigs in gold. This would set the ratio of gold to silver at 11.06 to 1.

In terms of the value of the florin it is interesting to examine the value of a few articles of commerce. We are told that a sheep cost 5 shillings $18\frac{17}{25}$ pfennigs which is equivalent to $ 1.46. The price of one elle of velvet is given as 1 florin 18 shillings, or an equivalent value of $ 11.77 a yard. We then find the price of 1 centner of rice to be $6\frac{3}{8}$ florins, which reduces to 25 cents for the equivalent pound of today's commerce. One also finds that it costs 3 florins to freight 4 centners a distance of 32 miles: this is equivalent to 9.2 cents per 100 pounds per mile.

The manuscripts also gives us some idea of the variations of the weights and measures as well as the values of the coins among the different countries and even in Germany itself. On Folio 7^v we have: "Item—7 pfunds at Padua are 5 pfunds at Venice and 10 pfunds at Venice are 6 pfunds at Nürnberg and 100 pfunds at Nürnberg are 73 pfunds at Köln, ..." and in speaking of silver on Folio 9^r we have: "100 marks at Lyons are 103 marks 7 lot 1 quentchen 2 pfennigs $\frac{1}{2}$ at Nürnberg."

This manuscript was probably written by GLASER for use in his classes in arithmetic. The wording of many of the examples is somewhat vague and complicated, while in other examples there are numerous errors in computation. It is true, however, that many of these errors may have arisen in the final copy of

(1) DOURSTHER, *Dictionnaire*.

the manuscript. The manuscript is of interest because it furnishes information concerning the methods of writing fractions in use at the time, the value of gold and other commodities in Germany, and particularly at Nürnberg, and the weights and measures of the period, with their variations between different cities and countries.

University of Maryland. A. W. RICHESON.

The Earliest Treatise on Tobacco: Jacques Gohory's "Instruction sur l'herbe Petum"

The first French work devoted principally to tobacco, JACQUES GOHORY's *Instruction sur l'herbe Petum* (1572), is an important contribution to the early literature of tobacco and to the history of that important plant, which was introduced into France in the middle of the sixteenth century (1).

The title of GOHORY's little book of only thirty-two pages is as follows : *Instruction sur l'herbe PETUM ditte en France l'herbe de la Royne ou Medicée. Et sur la racine MECHIOCAN principalement (auec quelques autres Simples rares et exquis) exemplaire à manier philosophiquement tous autres vegetaux* (2).

GOHORY's little work is the first devoted almost entirely to the subject of tobacco to be published anywhere. For this reason it is fitting to enumerate some of GOHORY's predecessors. Unfortunately, no complete or satisfactory bibliography of the literature of tobacco exists, and the early history of the plant, including its discovery and introduction into Europe in the sixteenth century, remains to a large extent uncertain. Many

(1) JACQUES GOHORY was born in Paris in 1520. A member of the legal aristocracy, he was long associated with the Parlement of Paris. He took an active part in the intellectual movement of the middle of the sixteenth century. In England, Flanders, and Rome he served with French ambassadors. Returning from Rome in 1556, for a number of years he lived in retirement, studying the natural and occult sciences, including alchemy. Greatly interested in outdoor life and especially in plants, about 1572 he founded an experimental laboratory and botanical garden near Paris. This establishment was known as the *Lycium philosophal Sanmarcellin*. Emerging from his solitude, GOHORY died in Paris in 1576 after spending the last three years of his life as a royal historiographer. A tireless popularizer of knowledge GOHORY made important translations of MACHIAVELLI and the *Amadis de Gaula*; he edited PARACELSUS's *De Vita longa*; and he was a Latin and French poet.

(2) Par I.G.P. Paris, GALIOT DU PRÉ, 1572.

of the numerous writers on tobacco assert that COLUMBUS's sailors saw tobacco in Cuba in November, 1492 (3). DENIS says that

INSTRVCTION
SVR LHERBE PETVM
DITTE EN FRANCE L'HERBE
de la Royne ou Medicée : Et ſur la racine
MECHIOCAN principalement (auec
quelques autres Simples rares & exquis)
exemplaire à manier philoſophique-
ment tous autres Vegetaux.

Par I. G. P.

NVIE, D'ENVIE, EN VIE!

A PARIS.
Par Galiot du Pré, Libraire iuré : ruë S. Iaques
à l'enſeigne de la Galere d'or,
1572.

FIG. 1.

(3) F. W. FAIRHOLT, *Tobacco : its History and Associations* (London, 1876), p. 13; FERDINAND DENIS, *Une Lettre sur l'introduction du tabac en France*, p. v. (appended to ALFRED DEMERSAY's *Du Tabac au Paraguay* (Paris, 1851). A good

it was known to Norman traders along the coast of Brazil in 1508 (4). The earliest printed work in which the plant is mentioned is PETER MARTYR's *Decades* in 1516 (5). CORTEZ is said to have sent tobacco seeds to CHARLES V from Mexico in 1520 (6). LAS CASAS in his history of the early discoveries of COLUMBUS referred to tobacco in 1527 (7). The first account of any length is found in the second edition of OVIEDO's important *Historia* in 1535 (8). The first references to the herb by French writers are found in a translation of PETER MARTYR in 1532 (9) and in JACQUES CARTIER's *Brief Recit*, which was first printed in 1545 (10).

There is considerable doubt as to the man who first introduced tobacco into Europe. Some have thought that the credit should go to RAMON PANE or to FRANCISCO HERNANDEZ (11). As for the first appearance of the plant in France, an error which originated in the sixteenth century made JEAN NICOT its introducer, although it was ANDRÉ THEVET who first brought the petum directly from Brazil in the year 1556. I quote from a recent writer on this subject :

"There were two introductions of the tobacco plant into France during the sixteenth century, due to ANDRE THEVET and JEAN NICOT respectively... In 1555 [THEVET] accompanied VILLEGAIGNON to Brazil... He spent three months in Brazil from November, 1555 to January, 1556... On his return to France he

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account of some of the early works on tobacco is that of ROBERT J. KANE, *Tobacco in English Literature to* 1700 (Harvard University thesis, 1929), especially the first chapter.

(4) DENIS, *op. cit.*, p. vii.

(5) PIETRO MARTIRE D'ANGHIERA, *De Orbo novo decades* (Alcalá, 1516), fol. c8-c8 v°, hiij.

(6) H. W. CLELAND, *On the History and Properties Chemical and Medical of Tobacco* (Glasgow, 1840), p. 10 : "But the first authentic account of its arrival [in Spain] places that about 1558, when it was brought by a physician named FRANCISCO HERNANDEZ, who had been travelling for several years in Mexico."

(7) BARTOLOMEO DE LAS CASAS, *Apologética Historia de las Indias* (Seville, 1527), cap. XLVI.

(8) GONZALO FERNÁNDEZ DE OVIEDO Y VALDES, *Historia general de las Indias* (Seville, 1535), lib. V, cap. II. The first edition (1526) does not mention tobacco.

(9) P. MARTYR, *Extrait ou recueil des isles nouvellement trouvées en la grand mer oceane* (Paris, SIMON DE COLINES, 1532). An anonymous translation. Tobacco is mentioned : decade I, lib. IX.

(10) JACQUES CARTIER, *Brief Recit* (Paris, 1545).

(11) A. GRENET, *Influence du tabac sur l'homme* (Paris, 1841), p. 16.

published a book on his experiences under the title *Les Singularitez de la France antarctique* (Paris, 1558)... In this work (12) THEVET describes the use of tobacco under the [native Brazilian] name *petum*... JEAN NICOT was the French ambassador to Portugal from 1559 to 1561. One day he went to see the prisons of the king of Portugal, and the keeper presented him with an herb as a strange plant brought from Florida. According to another version, it was a Flemish gentleman, DAMIAN DE GOES, who in 1558 had first cultivated tobacco in the royal garden, the seed having been imported from Florida. NICOT cultivated the herb in his garden in 1559, being primarily interested in its medicinal properties, and accomplished several marvelous cures... he forwarded specimens, seeds, and leaves to King FRANÇOIS II and CATHERINE DE ' MEDICI, the queen mother, with proper directions as to how to apply the drug (13). From 1560 tobacco cultivation began to spread in France"' (14)

After 1560, also, tobacco is frequently mentioned in cosmographies, herbals, and similar works relating to the new discoveries or to the science of botany (15). When JEAN LIEBAULT inserted into the 1570 edition of the much-read *Maison rustique* an account of the plant written by NICOT, the latter was almost universally considered responsible for the introduction of tobacco into France (16). The most popular writer on botany of the sixteenth century, the celebrated MATHIOLUS, was the first to classify the herb, although he gave it the name *Hyoscyamus niger* instead of *Nicotiana* (17). In 1570 FRANÇOIS BELLEFOREST also wrote

(12) A. THEVET, *Singularitez de la France Antarctique* (Paris, 1558), pp. 57-58, 60. A second edition appeared at Antwerp also in 1558.

(13) See NICOT's letter to the Cardinal of Lorraine, dated April 26, 1560, which is given by E. FALGAIROLLE in his *Jean Nicot, ambassadeur de France en Portugal au XVI^e siècle* (Paris, 1897), pp. 50 and xc.

(14) BERTHOLD LAUFER, *The Introduction of Tobacco into Europe* (Field Museum of Natural History, Anthropology Leaflet, Chicago, 1924), pp. 48-49. It is probable that NICOT was accepted as the one who introduced tobacco because he sent it to the queen mother.

(15) Worthy of mention are also the following works which refer to tobacco: NICOLAS BARRE, *Copie de quelques lettres sur la navigation du chevalier de Villegaignon ès terres de l'Amérique* and an Italian translation of THEVET's work which appeared in Venice in 1561.

(16) CHARLES ESTIENNE and JEAN LIEBAULT, *L'Agriculture et maison rustique* (Paris, 1570), livre VII, ch. 76.

(17) PETRI ANDREAE MATTHIOLI *Commentarii in sex libros Dioscoridis* (Venice, 1565), p. 1063 ff. As will be seen later, there were two kinds of tobacco known in Europe in the sixteenth century, the *Nicotiana rustica* or less desirable North American tobacco, and the plant which is used almost everywhere now, the *Nicotiana tabacum*, indigenous to South America. LAUFER, *op. cit.*, p. 51, says that THEVET introduced *Nicotiana tabacum*, NICOT, the other variety. It was the *Nicotiana rustica* which was confused with *Hyoscyamus* or henbane by some naturalists.

of tobacco (18). NICOLAS MONARDES in the following year improved upon all previous descriptions of the plant and its uses in medicine (19). Finally the botanists PENA and LOBEL devoted a page to tobacco in their book on plants which was published in 1570 (20). If JACQUES GOHORY had wished to collect all of the writings on tobacco which had appeared at the time he composed his short treatise, he would have had to include all those that I have enumerated and probably several more (21). But none of the works treated of tobacco alone; in all of them the description of the herb was buried under many pages dealing with other subjects. GOHORY's work was to have the advantage of being brief. It is time now to turn to the *Instruction sur l'herbe Petum* itself.

GOHORY's *Instruction sur l'herbe Petum* is to some extent an autobiographical work. It contains more useful information about its author's life than any other of his numerous writings. It describes the scientific activities which occupied his time from 1571 until his death in 1576. GOHORY mentions in this book many of the persons whom he knew and gives a good picture of his newly-acquired home on the grand rue Saint-Marceau-lès-Paris, where in 1572 he established the Lycium philosophal Sanmarcellin, a botanical garden and experimental laboratory, the prototype of the Jardin des Plantes (22). But it is not the purpose of this article to discuss GOHORY's life; rather I shall aim to give an idea of the contribution of the *Instruction* to the early literature of tobacco.

GOHORY dedicated this treatise to an Italian, don IAN FRANCISQUE

(18) F. BELLEFOREST, *Histoire universelle du monde* (Paris, 1570), livre IV, p. 260.

(19) N. MONARDES, *Segunda parte de las cosas que se traen de nuestras Indias Occidentales* (Seville, 1571), fol. 4 v°-26.

(20) MATHIAS PENA and PIERRE LOBEL, *Stirpium adversaria nova* (London, 1570), pp. 251-252.

(21) A dissertation on tobacco in French literature is being prepared at Harvard by EATON LEITH, to whom I am indebted for some of the names and titles given above.

(22) For more detailed information concerning GOHORY and his Lycium, see ERNEST HAMY, " Un précurseur de GUY DE LA BROSSE : JACQUES GOHORY et le Lycium philosophal de Saint-Marceau-lès-Paris (1571-1576)";Museum d'histoire naturelle, *Nouvelles Archives*, série 4, tome I (Paris, 1899), pp. 1-26, and my Harvard thesis on JACQUES GOHORY.

CARAFFE, duc d'Arian, a frequent visitor to the Lycium (23). At the beginning of the dedicatory epistle GOHORY speaks thus concerning some of the experiments which he had been performing :

FIG. 2.

"Or y ay entre autres œuvres des mineraux, vegataus, animaux, composé nagueres des Sig. Astronomiques... et le Vin Scyllitique ès dernieres vendanges avec toutes ses ceremonies... Aussi ay je composé le vinaigre de ces Squilles d'Espagne insolé ès mois de l'esté; les deux compositions de telle singularité que connaissez, Monsieur, par DIOSCORIDE, & vostre MATHIOLUS, dont vous estes amateur entre autres livres concernans les sciences naturelles : c'est à savoir pour la medecine

(23) CARAFFE was a member of a distinguished family, one of whose members was Pope PAUL IV.

interieurse de toutes nos parties principalles, ésquelles j'en ay veu fort heureux succez." (24)

The success of these experiments led him to undertake others of a different nature, he continues :

"Je m'estois apres advisé de preparer pareillement pour la chirurgie exterieure l'herbe PETUM, a raison de son excellence en maintes effects merveilleux : dont la France est aujourd'hui grandement obligée à sa Royne Caterine de Medicis, qui l'en ha peuplée, de qui elle doit, à bon droict porter le nom de Caterinaire, ou de Medicée : comme l'herbe Arthemisia, de la Royne d'Egypte." (25)

GOHORY says that he wrote down the results of his experiments with petum or tobacco (26) and had a picture of the male and female varieties of the plant made by a friend of his. It was the Duke of Arian who urged him to publish the treatise :

"Or l'y ay-je fait pourtraire par l'excellent peintre BAPTISTE PELERIN... à fin d'en donner connoissance aux estrangers : veu que MATHIOLUS n'en fait mention combien qu'il renouvelle et reforme presque tous les ans ses commentaires... Ce qui vous ha donné occasion de me persuader d'en mettre ce petit traité en lumiere." (27)

Since the tobacco plant was generally known in France by the name *herbe à la royne*, GOHORY thought it well to send his book to CATHERINE DE' MEDICI before it was printed, asking her if she would be willing for him to give the herb a name which would definitely honor her alone. GOHORY's words follow :

" ...ce traité, lequel j'avois naguerres envoyé en cour à Monsieur BOTAL medecin du Roy, de la Royne, et de Monseigneur le Duc d'ALENÇON, comme discours vegetal à luy tal à luy propre... et m'ha recité ledit Seign. l'avoir presenté à ma requeste, à la Royne mere du Roy... pour entendre de sa magesté s'il luy seroit agreable que ce discours fust publié, et duquel de ses noms il luy plairoit que

(24) *Instruction sur l'herbe Petum*, fol. 2-2 v°.

(25) *Ibid.*, fol. 2 v°.

(26) GOHORY does not use the word *tobacco* at all. THEVET called the plant which he knew *l'herbe angoulmoisine* after his native place; JACQUES CARTIER did not name the plant he described; OVIEDO was the first to call it tobacco, taking the name from a fork-shaped pipe through which the Indians were said to have received the smoke. The term *petum* was the most common name given to tobacco in France, although it was about as frequently called *l'herbe à la Royne* and also *Nicotaine* in honor of CATHERINE DE' MEDICI and JEAN NICOT respectively. GOHORY, as I am about to show, gave the herb still another name. See C. FERMOND, *Monographie du Tabac* (Paris, 1857), pp. 12-13; FAIRHOLT, *op. cit.*, p. 16, LAUFER, *loc. lit.*

(27) *Instruction, loc. cit.* Further on GOHORY says : "Recevez donques (Duc illustre) ce discours de l'herbe estrange et exotique que j'oublioiz (sans vous) en la moisissure, et remugle d'un bahu entre mes autres papiers" (*ibid.*, fol. 3).

l'herbe fust appellée, ou Caterinaire de son propre nom, ou Medicée de son surnom par bonne rencontre de plante medicinale excellente. Lequel m'a recrit que sa M^te^ trouvoit fort bon tout ce qui servoit au bien public, et qu'elle ne refusoit en estre la marrine [*sic*]. Aussi telles herbes à la verité ont plus conservé la memoire des Princes Antiques qui les ont surnommées, que leurs faits d'armes et toute autre grandeur. Car c'est chose plus recommandable d'avoir trouvé ou monstré un remede salutaire aux hommes, que par guerre leur avoir livré la mort, ou dommage en corps ou biens." (28)

GOHORY ends his dedication with a few words about the care of tobacco plants in winter and refers to NICOT's introduction of petum into France :

"Or avant qu'entrer en matiere, je diray que nostre Medicée approche fort du nom de medica mala. Aussi on l'encave l'hyver en mannequins ou brouettes comme les Orengers et citronniers en notre contrée trop froide, ..Sinon il leur fault faire quelque taudiz de paille ou nates, et les descouvrir seulement au Soleil de midy. Et est chose fort notable qu'elle branchoye de demy pied du long de sa tyge se peuplant fort de feuilles... En païs chaud elle est les 9 ou 10 moys de l'an chargée en mesme tems de feuilles, fleurs, cosses ou filiques pleines de graine verde, et meure noire et menuë... Elle a esté apportée de la Floride en Portugal, et de là envoyée à la Royne mere du Roy par le Seig. NICOT Me des requestes de son hostel, estant là ambassadeur pour sa magesté, personnage digne de louange. La Royne advertie par luy de ses singulieres vertus, l'ha heureusement multipliée en France : dont elle merite à droict, de luy imposer son surnom de *Medicée*, comme par excellence de sa propriété medicinale, ainsi que le nom general de plante est demeuré au plantain, selon des auteurs herbiers." (29)

In a short introduction to the main part of his *Instruction* GOHORY says that he composed this work on petum just as a Greek writer wrote a whole book on *Bassica* or cabbage, describing all its species (30). In his garden " nagueres acquiz au faux bourg sainct Marceau lez Paris'" he has many varities of plants unknown to the ancients. Among those plants are the " Petum masle et femelle " (31). His *Instruction* is a short treatise, therefore, " traittant les singularitez de l'herbe *Petum* ou *Medicée.* " (32)

In his description of the tobacco plant GOHORY says that there

(28) *Ibid.*, fol. 2 v°-3. This dedicatory epistle is dated June 1, 1572. The last sentence could hardly have been written after the massacre of Saint Bartholomew's Day two months later. The passage quoted above is found in FERMOND *op. cit.*, p. 13, and in DENIS, *Lettre sur l'introduction du tabac*, pp. xx-xxi. DENIS says that there is no doubt that CATHERINE DE' MEDICI was very much interested in the herb which was named for her. Cf. J. LIEBAULT, *Maison rustique*, *loc. cit.*

(29) *Ibid.*, fol. 3 v°-4.

(30) *Ibid.*, fol. 5.

(31) *Loc. cit.*

(32) *Ibid.*, fol. 5 v°.

are two kinds, usually called male and female petum (33). Some writers, however, have said that the female variety was not petum but *Satyrion* (34), but he does not agree with them. From experiments he has learned that both varieties may be used in medicine. (35) He will speak mostly of the male variety, and there follows his description of the plant :

"Pour lequel descrire, sa tyge monte bien jusques a sept pieds et plus de hauteur, telle que j'en ay eu une du jardin de Monsieur CHAPELAIN, luy vivant (36)... Elle ha plusieurs nœudz par intervalles, desquels sortent maints rameaux garniz de feuilles dont les plus haults surpassent les bas en grandeur, contenans la graine fort menue. Les fleurs sont presque semblables à celle de la nielle (37), blanches aupres le bord rouge. La racine ha des chevelures, les unes plus grosses, les autres plus deliées, mais asses courtes pour la haulteur de la plante. Les feuilles sont fort larges oblongues, de couleur verde jaunissant... Or elle porte en bon païs la plus grande partie de l'an feuille, fleur et graine verde ou meure." (38)

Concerning the medicinal qualities of petum, GOHORY accepts the account given in the *Maison rustique*, but he has much to add from his own experience. He has been able to cure a number of ailments by means of this new plant :

"De plusieurs de ses vertuz esprouvées en Portugal, font mention l'autheur de *la Maison rustique*, sur le rapport du Seign. NICOT, du nom duquel aucuns l'ont nommée Nicotaine, comme d'y avoir guary les gales, noli metan gere, ulceres chancreux, et les ecrouelles (39). En notre pays de France se sont veuz de tres-grands effects en la chirurgie... Icy donques ses proprietez sont eprouvées à guarir les playes, les ulceres apostumes, contusions, morphée, mesme la piquire de la vive, (40)... qui est souvent mortelle... j'ay telle piqure guarie en un de mes domestiques... Quant à la cure des Playes, j'en ay fait souvent l'expérience de la feuille seulle pillée... j'en ay guary une contusion de plus de deux ans, tournée en pourriture en une vieille femme Passementiere, pres la cheville du pied : et à plusieurs hommes et femmes des Rougeurs de visages, et des Galles farineuses, inveterées au front." (41)

(33) It is not now believed that there are male and female tobacco plants. GOHORY was no doubt speaking of *Nicotiana tabacum* when he refers to the male petum, and the female is either henbane, or more likely *Nicotiana rustica*, the less desirable variety of tobacco introduced by NICOT.

(34) *Satyrion* or *Satirium*, called stander-grass.

(35) *Instruction sur l'herbe Petum*, fol. 5 v°.

(36) JEAN CHAPELAIN died in 1569. GOHORY must have known petum as early as that date.

(37) Nielle is rose campion or fennel flower.

(38) *Ibid.*, fol. 5 v°-6.

(39) See the *Maison rustique* (Paris, 1570), fol. 80 ff.

(40) *Vive*, weever or viver, a fish of the genus *Trachinus*.

(41) GOHORY, *Instruction*, fol. 6-7. Part of the passage given above is quoted by FERMOND, *op. cit.*, p. 23.

GOHORY devotes several pages of his treatise to a description of the methods of preparing medicines from the leaves of petum and their various uses. There are five ways in which tobacco may be employed as a medicine : 1) the green leaves may be used by themselves; 2) water may be extracted by distillation in an alembic (42); 3) an ointment made by adding lard or grease and cooking the leaves is useful for certain cuts and sores (43); 4) a valuable oil is produced " par descensoire de verre en cornue de verre " (44); and 5) a compound which the alchemists call a salt is made in several different ways. For all these products GOHORY gives his own recipes and says that they may be used with many other plants besides petum, as the title of his work shows (45). The directions which he furnishes are specific : he tells what kind of vessels to use and criticizes the methods of other philosophers or alchemistic botanists. The author brings this part of his book to a close with the statement that he would not have revealed the methods of preparing the water, oil, ointment, and salt of petum without the permission of the queen mother, on account of their secret nature. Otherwise he would have given them in the philosophic language, which few can understand (46).

The next part of the *Instruction* is made up of GOHORY's comments upon the earlier account given by JEAN LIEBAULT in the 1570 edition of the *Maison rustique*. It is probable that GOHORY had not read widely concerning tobacco. He knew the herbals of FUCHS and RUEL, the botanical writings of MATHIOLUS and LOBEL, but he took as the authority for his statements on tobacco either the *Maison rustique* or the results at which he

(42) *Instruction*, fol. 7 v°.

(43) *Ibid.*, fol. 9-9 v°.

(44) *Ibid.*, fol. 7 v°-8°. "GOHORY avait certainement découvert l'huile volatile particulière qui existe dans les feuilles fraîches de tabac, que POSSELT et RESMANN ont appelé *Nicotianine*" (HAMY, *Jacques Gohory*, p. 17, n. 2).

(45) The title ends with the words :"exemplaire à manier philosophiquement tous autres vegetaux." "Philosophiquement" means in the manner of a chemist or alchemist, particularly of a follower of PARACELSUS. See also *ibid.*, fol. 7.

(46) *Ibid.*, fol. 9 v°-10. As a matter of fact, GOHORY does not reveal all his secrets. He states (fol. 9 v°) that there are three methods of making "sel artificiel" and that he has given them in his book on PARACELSUS. He gives only one in the *Instruction* in French; but in the Latin summary "De Peto Compendaria de Medicea traditio," appended to it, he has three ways. See *ibid.*, fol. 15 v°-16.

himself had arrived experimentally. On several points he differs from the account which LIEBAULT gives. GOHORY says that the author of the *Maison rustique* mentions the same things as he does but in a different language, not that of the philosophers (47). Furthermore the earlier writer did not give an accurate description of the plant or of the manner of its cultivation (48). If the seeds are planted deeply enough and kept warm it will grow to a height of more than five feet. It is wrong and wasteful to plant forty or fifty seeds in one hill, he says (49). LIEBAULT did not know the correct way of compounding and using the ointment of petum (50). But the most important error made by the writer of the 1570 article on tobacco was an error of omission :

"Ce qui est le plus notable il l'ha oublié : c'est que son odeur est resineux, non mal plaisant, tel qu'aussi le suc. C'est le point que s'y trouve le plus considerable au pris des autres herbes, et qui est cause de sa principale vertu." (51)

In France during the sixteenth century tobacco was regarded as a wonderful remedy brought from the new world and as a possible cure-all for diseases of the skin. Some of the accounts did mention the use of tobacco as a means of recreation among the natives of Florida, Mexico, Canada, and Peru (52). But Europeans, and especially those who lived on the continent, were slow to recognize in the herb anything but a garden plant or a new source of medicine (53). It is not surprising, therefore, that GOHORY was sceptical about the accounts which had come

(47) *Ibid.*, fol. 10.

(48) *Ibid.*, fol. 10-10 v°.

(49) *Ibid.*, fol. 10 v°.

(50) *Loc. cit.* The article in the *Maison rustique* mentions only the use of the crushed leaves and the ointment. The oil and salt of tobacco were first extracted by GOHORY and his companions of the Lycium.

(51) *Loc. cit.*, Some of the criticisms which GOHORY made of the description of the plant given by LIEBAULT may be due to the fact that each writer was discribing a different variety of tobacco. GOHORY has a picture of the male and female plants, but his description is of the former *(Nicotiana tabacum)*; LIEBAULT describes the plant brought to France by NICOT *(Nicotiana rustica)*, which is smaller than the supposed male variety.

(52) See OVIEDO, THEVET, and MONARDES in the works enumerated above.

(53) L. WIENER, *Africa and the Discovery of America* (Philadelphia, 1922, II, 181 : "nearly a century [after the beginning of the sixteenth] passed before the habit of smoking became universal among the Europeans." Cf. FAIRHOLT, *op. cit.*, p. 7; KANE, *op. cit.*, pp. 2, 14, 348. As late as 1861 tobacco was still employed in medicine.

from Florida by way of Portugal, as reported by the editor of the *Maison rustique*. Apparently GOHORY had not ventured to experiment himself, for he says, cautiously :

"C'est chose tres-memorable si elle est vraye, comme m'ha affermé de l'avoir experimenté CONSTANTIN, Lyonnois, mon familier... que le parfum de la Medicée sechée en l'ombre au plancher, soustienne au pais de la Floride d'ou elle a esté apportée et substante 3 ou 4 jours la personne en recevant la vapeur sur un rechaud par le nez." (54)

The reading public of the sixteenth century was extremely interested in the discoveries made in America. " NICOT's plant produced a tremendous sensation in France " (55). Interest in this and other new plants was great (56). GOHORY's account of petum must have enjoyed its share of the popularity which the works of OVIEDO, MONARDES, and LIEBAULT held, for in 1580 it was reprinted (57). Before that date, however, another writer saw fit to challenge the statements made by NICOT, LIEBAULT, and GOHORY in a book which was published in 1575. I refer to ANDRÉ THEVET's *Cosmographie Universelle*. I shall

(54) *Instruction*, fol. 11. See *Maison rustique*, *loc. cit.* The pages of GOHORY's treatise which follow those discussed above deal with other herbs which he had in his garden, including : "Euphrasie, Lunaires, Angelique, Scorpoides, Lapopus, et Salicor." A second part of the book deals with Mechoacan, a Mexican herb used as a purgative. The article is a translation from MONARDES. The little volume ends with the Latin version of the *Instruction*.

(55) WIENER, *op. cit.*, II, 151; *ibid.*, II, 181 : "The experiments carried on by NICOT, received full publicity in LIEBAULT's *Maison rustique* in 1570."

(56) A poet who was interested in tobacco was ESTIENNE TABOUROT. The following sonnet by him, inserted in GOHORY's *Instruction*, is worthy of quotation since it is probably the first poem in French in which tobacco is mentioned :

"Mon Gohory, dont les doctes écrits
Sont elongnés du sentier du vulgaire,
Tu ne pouvois plus bravement te plaire
Et contenter les curieux esprits,
Que décrivant cett'herbe de haut pris,
Qui peut cent fois d'elle mesme plus faire,
Que tout cela que dans l'Anabar Zaire,
Et ses suivants on veid jamais compris.
A cette cause on la dit Medicée,
Nom de la Royne : O bien heureuse plante,
Qui d'un tel nom par les Gaulles se vante.
Mais plus heureux ainsi que Coriphée
Des bons auteurs on te pourra bien dire,
Pour l'avoir sçeu si doctement décrire."

(57) Paris, chez JEAN PARENT, 1580.

examine briefly THEVET's remarks concerning what he calls *l'herbe Angoulmoisine* (58).

It will be recalled that THEVET actually visited Brazil, brought back some tobacco plants, and wrote an important article on petum which he published in 1558 (59). To him rightfully belongs the credit of having introduced tobacco into France. But NICOT's later introduction of the same plant, his experiments with it in Lisbon, his letter to the Cardinal of Lorraine, and his sending the plant to CATHERINE DE' MEDICI were more spectacular than anything THEVET did to make himself known. In the *Cosmographie universelle* THEVET declares :

"Je me puis vanter avoir esté le premier en France qui a apporté le graine de ceste plante, et paraillement semée, et nommé la dite plante, l'herbe Angoulmoisine. Depuis un quidam, qui ne fait jamais le voyage, quelque 10 ans apres que je fus de retour de ce pais, lui donna son nom. Ce sont folies de me vouloir faire accoire, les sauvages en leurs maladies se servent des feuilles de ceste plante (comme quelques uns ont descrit) : et principalement ceux qui ont playes et ulceres : Car elle n'a autre vertu ou efficace, sinon que je vous ay dit." (60)

These remarks were aimed at NICOT and LIEBAULT. The following statement refers to GOHORY, MONARDES, and others :

"Davantage je suis esbahi d'autres qui recitent avoir deux sortes de Petum, sçavoir masle et femelle... c'est une chose mal entendue à eux. Et ne fault mettre ici en admiration que l'une plante soit plus haulte ne les feuilles plus larges les unes que les autres." (61)

THEVET categorically denies the truth of several of the ideas which are to be found in GOHORY's treatise. He insinuates that GOHORY is an alchemistic quack. As HAMY has shown (62),

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(58) THEVET, *Cosmographie universelle* (Paris, PIERRE l'HUILLIER, 1575), tome II, fol. 926 v°-927.

(59) THEVET, *Singularitez de la France Antarctique* (Paris and Antwerp, 1558), pp. 57-60. See the edition of P. GAFFEREL (Paris, 1878), introduction and pp. 157-158.

(60) *Cosmographie universelle*, tome II, fol. 926 v°. The *quidam* is of course JEAN NICOT. The ten years referred to are the years between THEVET's return and the publication of the 1570 edition of the *Maison rustique*. THEVET mentions only the smoking of cigars by the natives of Brazil, as a means of relieving hunger and thirst or to ward off chills and does not believe in its medical efficacy.

(61) *Ibid.*, fol. 927. THEVET is correct in saying that there are no male and female varieties of tobacco, a belief which was current until the eighteenth century. He is mistaken in denying the existence of more than one kind of petum. I have already mentioned that *Nicotiana tabacum* is larger than *Nicotiana rustica*.

(62) HAMY, *Jacques Gohory*, pp. 15-19 and notes.

in attacking GOHORY's statements, many of which were the results of research in his laboratory, THEVET made some ridiculous errors of his own. He thus makes a mistake worse than any of GOHORY's, as will be seen from the following :

"Outre plus, ils ont mis en avant que, de mon herbe Angoulmoisine, par distillation d'Alembic, l'on peut tirer de l'eau (ce que je ne veux nier) aussi bien que de toutes autres herbes du monde : mais d'en tirer de l'huile, c'est se moquer. Et ne sçache Empiriques, Alchemistes, tireurs de quinte escence, ou Antimoniens, qui me le peussent faire accroire. Et *un certain Italien* qui a si curieusement escrit de la proprieté de cette herbe, *raconte la plus lourde bourde de tout le monde*, et montre bien qu'il ne voyagea jamais, asseurans le Lecteur que ladite herbe de Petum seiche soustient (au pays de la Floride, dont elle a esté apportée) ces pauvres Barbares quatre jours sans manger, en recevant la vapeur d'icelle par le nez, estant sur un rechault. J'ai honte de lire tels discours, veu *qu'il n'y eut jamais homme sous le ciel, qui avoit veu une seule plante de Petum à la Floride, ny mille lieuës à la ronde*. Somme, les Sauvages, avec lesquels j'ai longtemps conversé n'usent ne appliquent cette herbe petunienne, à une autre chose, que pour les effets ci dessus declarez... " (63)

It is quite probable that JACQUES GOHORY's little book on tobacco was widely read and considerably valued by persons who were interested in plants and medicine. Aside from being an imperishable monument to his Lycium, it must have influenced other men to study and cultivate new and exotic plants. Among GOHORY's most important successors, NEANDER mentions him (64), and EVERAERTS quotes from the Latin su mary of the *Instruction* at great length (65). Moreover, English readers as early as 1659

(63) THEVET, *loc. cit.* I have underlined certain of the most important phrases in the quotation given. The Italian mentioned is GOHORY. HAMY says that THEVET mistook GOHORY for an Italian, but my opinion is that he did it on purpose. It would be strange if they did not know each other, since THEVET was royal cosmographer during the time GOHORY was royal historiographer (1573-1576). Concerning the above passage HAMY says (*op. cit.*, p. 17, n. 1): "THEVET avait dit un peu plus haut que 'en hument la fumée par la bouche et la rendent par le nez' et que cela 'mesmement fait passer la soif et la faim pour quelque temps'. Quant à la non-existence du Tabac en Floride et 'mille lieues à la ronde', c'est pour reprendre l'expression de THEVET, une *bourde bien plus lourde* qu'aucune de celles qu'il reproche à son prédécesseur; il suffit pour la refuter de nommer les variétés bien connues des tabacs de Louisiane, Virginie, etc."

(64) J. NEANDER, *Tabacologia, hoc est Tabaci seu Nicotianae descriptio* (Leyden, 1626), p. 17.

(65) GILLES EVERAERTS, *De Herba Panacea* (Anvers, 1583 and 1587); edition of Utrecht, 1644 : pp. 47, 48-50, 54-55.

were familiar with GOHORY's recipes for making the three salts of petum, from the English translation of EVERAERTS (66).

To conclude : GOHORY's *Instruction sur l'herbe Petum* is an important work because it is the first book ever printed with a word meaning tobacco as part of its title (67). It is valuable also as a document concerning an early French botanical garden of the period when modern botany was beginning. As a work of pharmacology, the *Instruction sur l'herbe Petum* is worthy of study because it gives an account of the first attempts to prepare medicines from tobacco after laboratory experiments; in other words, with the possible exception of NICOLAS MONARDES, JACQUES GOHORY was the first to study the herb from the viewpoint of a chemist and a botanist at the same time. GOHORY was not satisfied to read about tobacco : " most of his knowledge of the plant... he seems to have gathered at first hand from his own observations or from conversation with his friends " (68).

Oxford, Ohio. WILLIS HERBERT BOWEN.
January, 1937.

(66) G. EVERAERTS, *Panacea : or the Universal Medicine* (London, 1659), pp. 44, 45-47, 52.

(67) As the full title indicates, the book is not entirely devoted to tobacco, since other herbs are mentioned, and the second part of the pamphlet is about an entirely different plant.

(68) A. C. POTTER, *Some Early Books on Tobacco* (Harvard University Library, typed manuscript, 1910), p. 3. GOHORY, as I have shown above, made use of the 1570 edition of the *Maison rustique*. He was also acquainted with MATHIOLUS and the *Stirpium adversaria nova* of MATHIAS DE L'OBEL. He probably had not seen the second part of MONARDE's *De las Cosas que se traen de nuestras Indias*, in which tobacco was mentioned; nor had he read OVIEDO or PETER MARTYR, since he nowhere uses the word *tabaco*, the term those writers employed. Of all the books which mentioned tobacco before him, one can be certain only that GOHORY had read LIEBAULT and LOBEL.

Josephus Blancanus and the adoption of our word "Telescope"

One of the most interesting chapters in the story of man's pursuit of civilization is that of his invention of new instruments and his coinage of words by which to identify them. Following invention there have usually appeared many variations of a device, together with many words to describe it. As the historian of science has observed, such was the case with the telescope, which, in one line of descent, apparently developed from the field glass of the sixteenth century, the dual lenses of the Belgian spectacle maker, and the *optic tube* of GALILEO. Constructed at first from a variety of materials and designs, the telescope likewise was identified by a variety of names, among them the *optic tube* mentioned above, *optic glass*, *perspective*, *perspective glass*, *trunck-spectacle*, *trunk glass*, *perspicillum*, *conspicillum*, *mathematician's perspicil*, *occhiale*, *specillum*, and *penicillium* (1).

As one might well expect, it was for decades the common practice of writers to utilize one or more, and generally more, of these varied terms within a single work, chapter, or sentence. Because of this custom it is of decided interest that in 1620 there appeared an important treatise on astronomy which consistently and repeatedly used the word *telescope*. This was the *Sphaera Mundi* of JOSEPHUS BLANCANUS, or GIUSEPPE BIANCANI. It would be a fruitless task to enumerate the many repetitions of *telescopium* in its various case endings to be found in this work of approximately 200 folio pages (2). We may note, however,

(1) A list of some few of the writers who employed these terms, with quotations from their works, will be found in the *Oxford English Dictionary*, under "telescope", and in "The Telescope and Imagination", of Professor MARJORIE NICOLSON, *Modern Philology*, XXXII (1935), p. 245.

(2) BLANCANUS was of course not the originator of the word "telescope", which probably came from Prince CESI, founder and head of the Roman Academy of the Lincei, or from some member of the organization. In a letter apparently

telescopij in the preface, *telescopium*, p. 73 (mispaged 71), *telescopij*, p. 75 (mispaged 73), *telescopij*, *telescopium*, *telescopij*, *telescopium*, *telescopium*, pp. 130-1, *telescopium*, *telescopij*, *telescopij*, *telescopium*, pp. 137-8, *telescopium*, p. 142, *telescopij*, p. 148, *telescopij* and *telescopio*, p. 151, *telescopio*, p. 161, *telescopio*, *telescopio*, p. 164, and *telescopij*, p. 208 (3).

According to the information of the present writer BLANCANUS, or BIANCANI, was the first to employ exclusively and repeatedly the term "telescope" in an extended treatise. More important, however, is the fact that his example and influence undoubtedly hastened general acceptance and use of the term. BLANCANUS was one of the most able and respected of the Catholic astronomers, and his work, *Sphaera Mundi*, was available in at least four editions, 1620, 1630, 1635, and 1653. Any work of the type of the *Sphaera Mundi* which was four times printed within thirty-four years had achieved appreciable success.

In passing, it may be mentioned that following the text of the *Sphaera Mundi*, BLANCANUS presented on pp. 205-218, a comprehensive "Apparatus ad Mathematicas". This "Apparatus" not only is noteworthy for the extent and fullness of its classified bibliography, but for the evidence which it provides of the steady advance of organized science during the first quarter of the seventeenth century.

Smith College,
Northampton, Mass. GRANT MCCOLLEY

written in 1613, J. B. PORTA, *Galilei Opere* (1901) XI, 611, attributes the coinage of the word to Prince CESI : "Telescopium multis ostendi (lubet hoc uti nomine a meo principe reperto)". The unsigned preface of the *Apologia pro Galileo* of CAMPANELLA, Francofvrti, 1622, p. 3, in a statement which seems to have escaped notice, mentions in passing, and indirectly, that the new invention was called "telescope" by the Academy : "...per instrumentum illud opticum, quod Lyncei Philosophi Romani Telescopium vocant".

(3) All page citations in the present note are to the edition of Mvtinae, 1635. I am indebted to the University of Michigan Library for the loan of this relatively rare work.

Nel secondo centenario della nascita di G. L. Lagrange 1736-1936

Simpatie od avversioni personali, devozione di discepoli o gelosie di scuole, riconoscenza per benefici ricevuti o rancore per ripulse subite, tutto congiura per ottenebrare la considerazione di grandi o piccoli uomini da parte dei contemporanei o dei posteri immediati. Ma il giudizio pronunciato sopra eminenti personalità a molti decenni dall'epoca in cui vissero ed operarono, può ritenersi definitivo : tale deve indubbiamente riguardarsi quello che oggi viene concordemente pronunziato sopra GIUSEPPE LUIGI LAGRANGE, a due secoli del fausto giorno in cui egli vide la luce.

La famiglia LAGRANGE è oriunda dalla TURENNA, ma si trapiantò in Italia verso la metà del secolo XVII. Fu il bisnonno del sommo matematico che, dopo avere raggiunto il grado di capitano nell'esercito di LUIGI XIV, abbandonò la Francia per passare al servizio di CARLO EMANUELE II, duca di Savoja; questi, onde manifestargli il proprio compiacimento pel modo in cui egli aveva disimpegnate alcune delicate missioni affidategli, gli concess in moglie una parente di colui che doveva assurgere alla cattedra di S. Pietro col nome di INNOCENZO XIII. Il favore sovrano di cui godeva il bisavolo continuò verso il nonno, la cui moglie (non è fuor di luogo rilevarlo) fu una contessa BORMIOLO di Vercelli; giacchè, appunto per lui, venne creata la carica di tesoriere della R. Intendenza delle fabbriche e fortificazioni, che rimase, quasi feudo, nella famiglia LAGRANGE sino al giorno (1800) in cui venne soppressa per ragioni amministrative. Essa fu occupata anche dal padre del Nostro, la cui madre—TERESA GROS—era figlia di un medico di Cambiano (località prossima a Torino). Da questo matrimonio nacquero ben undici figli, di cui sopravvisero soltanto due, l'ultimo ed il primo, GIUSEPPE LUIGI, il quale nacque addì 25 gennajo 1736 a Torino, città ove la famiglia abitò costantemente dopo il proprio trasferimento in Italia.

Alcune mal riuscite speculazioni finanziarie avendo pressochè distrutta la fortuna di essa, il padre decise di avviare il suo primogenito verso la lucrosa professione dell'avvocato; il giovane non si oppose a tale disegno e a soli quattordici anni fu inscritto nella Università di Torino (1); ma essendo ivi venuto a contatto col fisico P. BECCARIA e col matematico F. REVELLI, sentì di essere da natura destinato a coltivare le scienze (2). Da principio si dedicò alla geometria, ma ben presto la lasciò per l'analisi, nella quale avvertì più vasto campo di applicabilità. In questa disciplina fece rapidamente mirabili progressi, senza che per molto tempo la famiglia fesse avvertita di questo nuovo orientamento subito dai suoi studi : ciò è dimostrato da un episodio che giova quì riferire.

Un giorno l'ambasciatore di Francia presso la Corte sabauda si presentò alla madre di LAGRANGE per congratularsi con essa e consegnarle un premio conferitogli dall'Accademia delle scienze di Parigi, per essere egli riuscito vincitore in un pubblico concorso; la madre si stupì del motivo della visita ed era ripugnante ad accettare un premio di matematica destinato a chi era avviato all'avvocatura; e solo in seguito ad indubbie spiegazioni si indusse ad riceverlo, non senza lamentare la poca assiduità del giovane nello studio presso cui avrebbe dovuto far pratica.

La precocità del grande di cui ragioniamo è documentata da una lettera che egli diresse al conte di FAGNANO (3); essa prova che nel 1754 egli investigava le relazioni che intercedono fra le

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(1) Il diploma d'inscrizione trevasi riprodoto in calce al presente articolo grazie ad una fotografia gentilmente offerta dal ch.mo Prof. COSTANTINO BOTTO, al quale dobbiamo anche gli altri documenti ed i ritratti da noi riprodotti. Riguardo a questi ultimi va notato come due altri se ne conoscano; uno venne pubblicato da G. BRIANO nell'opuscolo citato nella nota (6), l'altro da me nell'articolo della *Bibliotheca mathematica*, pure indicato nella nota stessa.

(2) Alcuni particolari intorno ai primi studi matematici di LAGRANGE leggonsi a p. 115-7 dell'opera dell'EANDI, *Memorie istoriche intorno gli studi del Padre* GIAMBATTISTA BECCARIA *delle Scuole Pie* (Torino, 1783). Il passo relativo trovasi riprodotto a p. XXV del *Bollettino di matematica*, 1937.

(3) E' questo l'unico lavoro di LAGRANGE scritto in italiano. A spiegare tal fatto si osservi che il francese era allora talmente in uso in Piemonte che VITTORIO ALFIERI trasferì le sue tende dalle rive del Po a quelle dell'Arno appunto per essere certo di scrivere le proprie tragedie nella lingua di DANTE e non in quella di RACINE. A Berlino poi, tutti sanno che, durante il regno di FEDERICO IL GRANDE, la lingua ufficiale era il francese.

REGII TAURINENSIS ATHENÆI RECTOR.

QUANDOQUIDEM *D. Josephus La Grange Taurinensis* in Taurinensi Archigymnasio sedulam operam navare studet, atque in albo Studiosorum ejusdem Archigymnasii descriptus est, ejus ob eam rem in Academicorum honorum gradibus petendis ratio habeatur, si de ipsius diligentia, studioque in hac addiscenda disciplina præstitutis Regia Sanctione temporibus constiterit. Eundem propterea nonnisi apud Academiæ Magistratum, cui de Studiosorum caussis notio, ac judicatio Regia Constitutione data est, in jus vocare liceto. Omniaque demum, quæ agere, facere Studiosis omnibus licet, iis beneficiis, privilegiisque, quæ REX NOSTER concessit, restituitque, eidem *D. Josepho La Grange* agere, facere jus sine fraude esto. Dat. Augustæ Taurinorum *Mense Novembris* Anno a partu Virginis *M DCC L.*.

Bogino R

Philipponus L

FIG. 1. — 1750.

CHARLES EMANUEL

Par la grace de Dieu Roi de Sardaigne, de Chipre, & de Jéruſalem; Duc de Savoie, de Monferrat, d'Aoſte, de Chablaix, de Genevois, & de Plaiſance; Prince de Piémont, & d'Oneille; Marquis d'Italie, de Saluce, de Suſe, d'Ivrée, de Ceve, du Maro, d'Oriſtan, & de Sezane; Comte de Maurienne, de Genève, de Nice, de Tende, de Romont, d'Aſt, d'Alexandrie, de Gocean, de Novare, de Tortonne, de Vigevano, & de Bobbio, Baron de Vaud, & de Faucigny; Seigneur de Verceil, de Pignerol, de Tarantaiſe, de la Lumelline, & de la Vallée de Seſia; Prince, & Vicaire perpétuel du Saint Empire en Italie, &c.

PAr ces préſentes ſignées de notre main Nous ordonnons à tous Gouverneurs, & Commandans de nos Places, & Provinces, à tous autres nos Officiers, tant de Juſtice, que de Guerre, & généralement à tous ceux qui reconnoiſſent notre autorité, de laiſſer librement paſſer Louis La Grange Profeſſeur de Mathematique; a notre ſervice, qui va en France, en Angleterre, et en Allemagne pour voyager, ... *ſans lui cauſer, ni permettre qu'il lui ſoit cauſé aucun trouble, ou empêchement, lui donnant au contraire toute l'aſſiſtance néceſſaire au beſoin: Car tel eſt notre bon vouloir; Requerons en outre tous les Potentats, Princes, & Republiques, ſur les Etats deſquels il conviendra au ſuſdit* Louis La Grange *aller en allant qu'on retournant de paſſer comme deſſus d'en faire uſer de même, Nous offrant d'y correſpondre dans les occaſions. Données à Turin ce 29. Octobre 1762.*

Emanuel

Raiberti

FIG. 2. — 1763.

operazioni di differenziazione e elevazione a potenza; le osservazioni relative da lui fatte furono poi riconosciute non dissimili da altre a cui ben prima era stato condotto LEIBNIZ; vuolsi che il dolore provato quando ne venne avvertito lo facesse cadere in deliquio; ma ben presto si riebbe quando egli, in conseguenza di quel lavoro, con decreto del 26 settembre 1755 venne nominato professore nelle RR. Scuole matematiche d'artiglieria (è l'istituto che, dopo varie metamorfosi, divenne l'attuale R. Accademia militare di Torino); in conseguenza codici e pandette furono definitivamente relegate in soffitta. La materia da lui insegnata era l'analisi infinitesimale, come risulta dal riassunto gelosamente conservato a Torino nella Biblioteca del Duchi di Genova.

Tre anni dopo (1757) LAGRANGE, col concorso di due amici, fondò quella Società scientifica che, dopo numerose modificazioni, diede luogo all'attuale R. Accademia delle Scienze di Torino. Nei cinque volumi da essa pubblicati (ben noti agli studiosi sotto il nome di *Miscellanea Taurinensia*) egli pubblicò una serie di memorie della massima importanza; basti fra esse ricordare quella sul nuovo algoritmo da lui concepito, a quanto narrasi, mentre ascoltava la messa nella Chiesa di S. Filippo e che porta oggi, seguendo la proposta dell'EULER, il nome di "calcolo delle variazioni".

L'invio al D'ALEMBERT del I Volume della *Miscellanea Taurinensia* fu origine di una relazione d'amicizia che ebbe col tempo per LAGRANGE conseguenze decisive. Sorse allora in lui il desiderio di conoscere di persona quel celebre scienziato e gli altri matematici residenti a Parigi; potè soddisfarlo approfittando della compagnia di un amico (il marchese CARACCIOLI) il quale, recandosi a Londra, avrebbe sostato nella capitale della Francia (4). Qui il Nostro trascorse i mesi dal novembre 1763 al maggio 1764; malgrado una non lieve malattia da cui fu allora colpito, egli li ricordò sempre come fra i più felici della propria vita.

Due anni dopo EULER, cedendo alle reiterate insistenze di CATERINA di Russia, decise di lasciare Berlino per Pietroburgo. D'ALEMBERT avutone sentore, chiese a LAGRANGE se fosse disposto a succedergli; avutone risposta affermativa (5), fece pervenire a

(4) Il relativo passaporto è il secondo dei documenti da noi riprodotti.

(5) Questa deliberazione non deve stupire chi ricordi che la corte di Berlino esercitava allora un'attrazione talmente potente che non seppero resistervi per-

LAGRANGE invito ufficiale di recarsi alla corte di FEDERICO II in qualità di membro ordinario dell' Accademia prussiana e direttore della classe matematica. L'eminente scienziato si affrettò a chiedere udienza a CARLO EMANUELE III, che allora occupava il trono di Sardegna, onde ottenere licenza di espatrio; il sovrano si mostrò riluttante ad acconsentire, anzi, nel corso di quell'udienza, cominciò per negarglielo; ma, dopo averlo congedato, lo richiamò chiedendo di conoscere la lettera d'invito ricevuta da LAGRANGE; e quando lesse ivi la frase "è necessario che il più grande geometra d'Europa viva presso il più grande dei suoi re", indispettito pose fine al colloquio dicendo : " andate pure presso il più grande re dell'Europa".

Superato ogni ostacolo LAGRANGE lasciò Torino, ove non doveva fare più ritorno e sino dal 6 novembre 1766 potè assumere l'importante ufficio a cui era stato chiamato ed iniziare un periodo di straordinaria attività scientifica; infatti allora egli compose una folla di memorie su tutti i rami della matematica (teoria dei numeri, algebra, analisi infinitesimale, geometria analitica, meccanica razionale e celeste), ognuna delle quali contrassegna un progresso per le nostre cognizioni matematiche.

Con la morte di FEDERICO IL GRANDE (1786) il soggiorno a Berlino perdette per LAGRANGE la miglior parte delle sue attrattive; in conseguenza egli prestò facile orecchio all'invito di trasferirsi a Parigi, che, auspice MIRABEAU — allora incaricato d'affari della Francia presso la Corte prussiana — venne a lui rivolto da LUIGI XVI, spinto a ciò dal desiderio di sorvegliare la stampa della sua *Mécanique analytique* che stava per cominciare a Parigi. Gli è nel 1787 che LAGRANGE raggiunse la sua nuova residenza; qui ricevette festose accoglienze, non soltanto dai sovrani, ma anche dai membri dell'Accademia delle scienze, i quali, non potendo accogliere, *lui straniero*, come membro ordinario, crearono, apposta per lui, il titolo e il grado di "pensionario onorario."

L'arrivo di LAGRANGE a Parigi cadde in uno dei periodi più agitati e pericolosi che ricordi la storia del mondo; quindi non mancarono a lui ansie e dolori; basti ricordare che, quando venne promulgata la legge di espulsione di tutti *gli stranieri*, egli si vede minacciato da un nuovo non desiderato trasferminento

sonalità eminenti quali MAUPERTUIS e VOLTAIRE, EULER e LAMBERT; d'altronde l'esodo di uomini di studio era cosa assai comune durante il secolo XVIII.

e lo evitò grazie all'intervento di amici potenti, i quali fecero valere a suo favore gli studi che andava facendo a vantaggio della republica, fra cui basti citare la sua partecipazione alla Commissione che portò alla creazione del sistema decimale di pesi e misure. Istituita l'École centrale des travaux publiques (detta poi École polytechnique) e l'École normale, egli fu subito chiamato ad insegnarvi, il che diede a lui occasione per pubblicare una serie di opere didattiche di squisita fattura, che oggi ancora servono di scorta e lume per sempre nuove generazioni d'investigatori.

Durante il Consolato e l'Impero furono a lui conferiti tutti gli onori consentiti dalle leggi del tempo; ciò che non deve stupire perchè NAPOLEONE tributava a lui un'ammirazione che può ben dirsi culto (6). Benchè gracile, la sua salute si conservò soddisfacente e la sua mente di fulgida lucidità; gli è soltanto nei primi mesi del 1813 che si verificarono alcuni fenomeni allarmanti, precursori di una fine che, con generale cordoglio, avvenne il 10 aprile di detto anno. Giova ricordare che allora l'Italia settentrionale era parte integrante dell'Impero, onde LAGRANGE era legalmente cittadino francese; nessuna meraviglia, pertanto, se alla sua salma sia stato accordato un posto onorevole nel tempio dedicato "à toutes les gloires de la France"; oggi, non vi è matematico che, recandosi a Parigi non cerchi nel Pantheon la tomba in cui egli giace in eterno ripose e che gli è additata dalla seguente (quanto secra e gelida !) epigrafe scritta certamente da qualche burocrate :

JOSEPH LOUIS LAGRANGE
sénateur et comte de l'Empire
grand cordon de la légion d'honneur
grande croix de l'ordre impérial de la réunion
membre de l'Institut et du Bureau des longitudes
né à Turin département du Pô le XXV Janvier 1736
mort à Paris le X avril 1813.

Si direbbe però che NAPOLEONE non dimenticasse qual fosse il sangue che correva nelle vene dell'illustre scomparso, chè ordinò di lui fossero tenute solenni commemorazioni, non in tutte le

(6) Di tali sentimenti è prova il fatto che nel 1795 P. L. GINGUENÉ, commissario del Direttorio a Torino, ebbe incarico dal ministro degli esteri della vicina repubblica di presentare gli ossequi del Governo francese al vecchio LAGRANGE ormai novantenne.

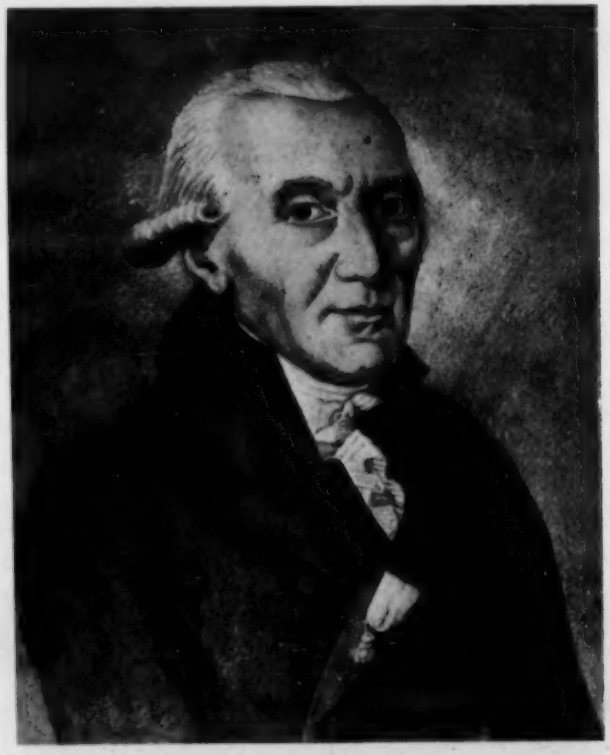

FIG. 3.

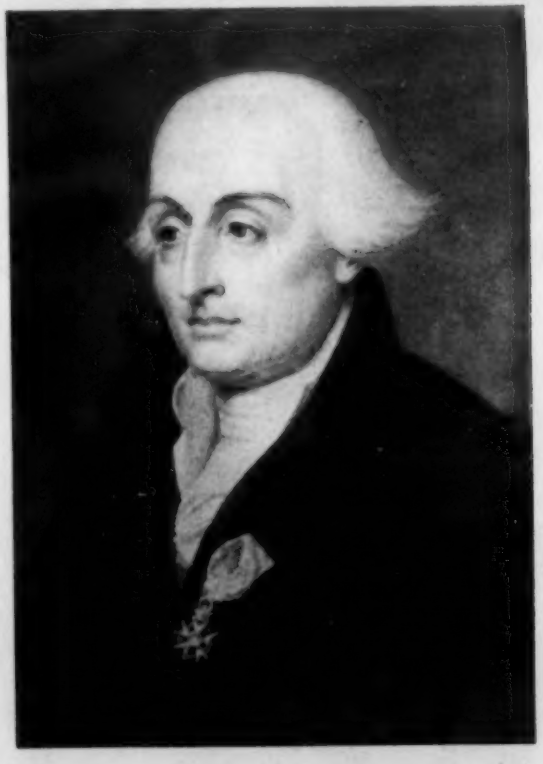

FIG. 4.

Ritratti di Lagrange

FIG. 6.

FIG. 5.

Ritratti di Lagrange

FIG. 7. — Ritratto di Lagrange

FIG. 8. — Autógrafo di Lagrange

FIG. 9. — Monumento in Torino

Università dell'Impero, ma soltanto in quelle di Bolgona, Padova e Pavia. All'Accademia delle scienze di Parigi l' "Éloge" di rito fu tenuta dall'allora segretario perpetuo DELAMBRE, con l'eloquenza e la profondità che potevano ragionevolmente attendersi da un tal uomo. E' però da lamentare che, accecato dal patriottico dolore di non potersi ritenere della stessa stirpe del grande di cui vantava il genio, abbia voluto fare di LAGRANGE un francese; tesi insostenibile dal punto di vista del diritto positivo, smentita da dichiarazioni fatte da LAGRANGE in ogni occasione e da molte circostanze da noi riferite e che fu combattuta da tutti, non esclusi coloro che, serenamente, si occuparono della questione; (7) ne vuole

(7) Tutte le storie delle matematiche nonchè le enciclopedie e i dizionari biografici si occupano più o meno diffusamente di LAGRANGE. Numerosi scritti trattano particolarmente di lui; i principali sono registrati nel seguente Elence.

DELAMBRE, Notice sur la vie et les ouvrages de M. MALUS, et de M. le Comte DE LAGRANGE (*Mém. de l'Institut de France*, 1812, riprodotta per quanto concerne LAGRANGE in testa all'edizione delle *Œuvres complètes*).

Moniteur del 26 febbraje 1814; articolo firmato L.B.M.D.G. e dovuto a persona intima di LAGRANGE; fu riprodotto da C. A. BJERKNESS nella sua *Vie* de ABEL (Paris, 1885), con un'errata indicazione della fonte.

P. COSSALI, Elogio di L. LAGRANGE (Padova, 1831).

A. M. VASSALLI-EANDI, Notice abrégée de la vie et des écrits de LOUIS LAGRANGE (memoria lette dinnanzi all'Accademia delle scienze di Torino il 3 maggio 1813, ma mubblicata soltanto nel 1871 nel T. XII delle *Miscellanea di storia italiana edita per cura della R. Deputazione di storia patria*.

DE GREGORY, Necrologia di tre piemontesi illustri : CAV. BORDONI, G. B. DENINA e conte LAGRANGIA LUIGI (VERCELLI, 1814).

G. B. MAGISTRINI, Discorso in lode di L. LAGRANGE (Bologna, 1816).

VIREY et POTEL, Précis historique sur la vie et la mort de J. L. LAGRANGE (Paris, 1813).

L. MARTINI, Cenni biografici di LAGRANGIA (Torino, 1840).

G. BRIANO, GIUSEPPE LUIGI LAGRANGIA (opuscolo recante il N. 24 nella collezione *I contemporanei italiani, Galleria nazionale del Secolo XIX*; Torino, 1861).

L. F. MENABREA, LUIGI LAGRANGE (*Atti della R. Accedemia delle scienze di Torino*, Vol. II, 1876-77).

F. CHIÒ, LAGRANGE (in appendice al numero in data 16 Giugno 1867 della *Gazzetta di Torino*; riprodotto nel *Bollettino di matematica*, 1937).

A. FORTI, Intorno alla vita e alle opere di LUIGI LAGRANGE (II ed. Roma, 1869).

A. GENOCCHI, LUIGI LAGRANGE (sta nel volume *Il primo secolo della R. Accademia delle scienze di Torino*, Torino 1883).

A. HARNACK, *Geschichte der k. Preuss. Akademie der Wissenschaften*, T. I, (Berlin, 1900).

G. VACCA, Sui primi anni di GIUSEPPE LUIGI LAGRANGE (*Bell. di bibl. e storia delle scienze matem.*, T. IV, 1901).

una prova il lettore? Essa è fornita dal fatto che quando all'approssimarsi del primo centenario della morte (1913), la direzione degli *Annali di Matematica*, invitò gli scienziati di tutto il mondo a collaborare ad un volume in suo onore, le adesioni furono talmente numerose (e tali non sarebbero state se fosse stato riconosciuto che si trattava di una iniziativa che l'Italia *non* aveva il diritto di assumere) che si dovettero destinarvi due volumi. Malgrado l'insostenibilità di quella tesi, vi fece adesione l'ARAGO, citando in appoggio di essa la desinenza del cognome della madre di LAGRANGE, senza badare che invocava un argomento di nessun peso e che anzi doveva accuratamente evitare tenendo presente la struttura esotica dello stesso proprio nome. Duole poi di vedere che allo stesso concetto si attenne un eminente storico che, nell'articolo dedicato a LAGRANGE nella *Grande Encyclopédie* lo designò con l'ambigua frase di "mathématicien français né à Turin".

Per ordine di NAPOLEONE, il Governo francese aquistò dagli eredi, non soltanto la sua biblioteca, ma eziandio tutte le carte da lui relitte, e ordinò che l'Accademia delle scienze le esaminasse e decidesse quanto eventualmente vi si trovasse degno di stampa. La commissione incaricata di queste lavoro, ispirandosi a direttive ormai abbandonate, riferì in senso negativo ed a tale concetto si attennero anche coloro che diressero la pubblicazione delle sue *Opere complete*. Più tardi, qualche nuovo esame, ispirato ad altri concetti, portò alla conclusione che quel responso fu troppo rigoroso. Perciò da tempo fu emesso l'avviso che venisse pubblicato un volume di supplemento alla raccolta delle opere, nel quale potrebbero trovar

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G. LORIA, G. L. LAGRANGE nella vita e nelle opere (*Annali di matematica*, II Ser. T. XXI, 1913; riprodotto nel volume *Scritti, conferenze, discorsi*, Padova, 1937).

G. LORIA, LAGRANGE e la storia delle matematiche (*Bibl. mathem.*, III Ser. T. XIII, 1912-13).

L. GUARESCHI, Notizie storiche intorno a LUIGI LAGRANGE (*Mem. della R. Acc. delle scienze di Torino*, Ser. II, Vol. XLIV, 1914).

W. LOREZ, JOSEPH LOUIS LAGRANGE, Zur 200. Wiederkehr seines Geburtstages am 25-1-1936. (*Journ. f. reine und angew. Mathem.*, T. 175, 1936).

G. LORIA, LAGRANGE nelle Accademie di Berlino e Parigi (nel volume *A. Lorgna, Memorie pubblicate nel secondo centenario della nascita a cura dell'Accademia di Verona*).

A. PERNA, Nel bicentenario della nascita di GIUSEPPE LUIGI LAGRANGIA (*Scuola e cultura*, T. XII, 1936).

posto anche le numerose sue lettere che vennero rintracciate in questi ultimi tempi (8) ed altre che potessero venire scoperte in seguito a rinnovate indagini. Con tale pubblicazione verrebbe commemorato nel modo più significativo il secondo centenario dell'immortale scienziato a cui l'Italia diede i natali, la Germania assicurò un lungo periodo di pace feconda e la Francia conferì tutti gli onori a cui può ragionevolmente aspirare un uomo di genio.

Isis si fa interprete degli universali sentimenti di devota ammirazione per Lui pubblicando una serie di documenti che lo concernono, i cui originali sono religiosamente conservati a Torino presso i suoi discendenti.

(Genova) GINO LORIA

(8) Importanti elementi del carteggio di LAGRANGE si trovano nelle seguenti pubblicazioni :

O. GHERLI, Gli elementi teorico-pratici delle matematiche pure (T. VII, Modena, 1777, p. XII).

F. SCLOPIS, Lettera di LUIGI LAGRANGE al marchese D. CARACCIOLO (*Atti della R. Accademia di Torino*, T. VII, 1871).

E. BELTRAMI, Comunicazione di una lettera di LAGRANGE a F. M. ZANOTTI (*Rend. della R. Accad. di Bologna*, 16 gennajo 1873).

C. HENRY, Sur quelques billets inédits de LAGRANGE (*Bull. di bibl. e storia e ecc.* T. XIX, 1886).

A. FAVARO, Sette lettere inedite di L. LAGRANGE al P. PAOLO FRISI (*Atti della R. Accad. di Torino*, T. XXXI, 1895).

G. PITTARELLI, Due lettere inedite di LAGRANGE all'abate CALUSO (*Atti del IV Congresso matematico*, Roma 1906, T. III).

Opere matematiche del Marchese GIULIO CARLO de' TOSCHI DI FAGNANO pubblicate da V. VOLTERRA, G. LORIA, D. GAMBIOLI, Vol. III, Roma 1912.

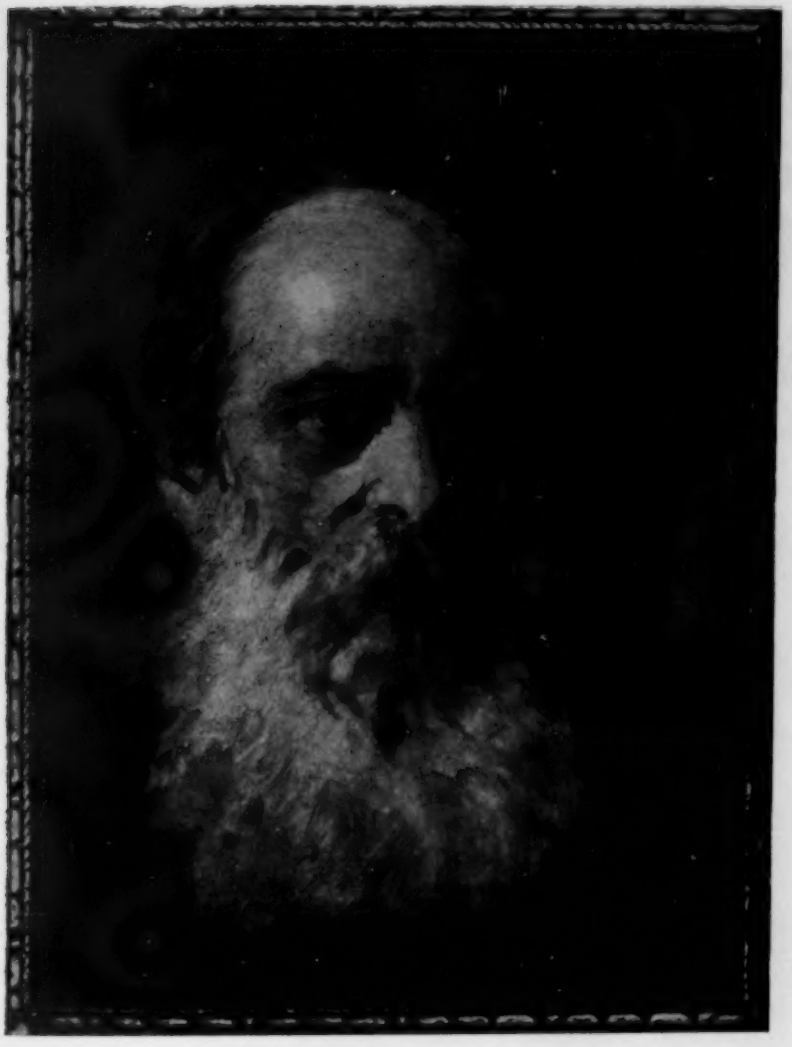
K. BOPP, Eine Schrift von ENSHEIM "Recherches sur le calcul différentiel et integral" mit einem sich darauf beziehenden, nicht in die "Œuvres" übergangenen Brief von LAGRANGE, analysiert und zum 10. April herausgegeben. Gefolgt von einem Ueberblick über die Publicationen von LAGRANGE (*Sitzungsber. der Akad. Heidelberg*, 1913).

John Turtle Wood, discoverer of the Artemision 1869

My attention was drawn to a letter addressed to the Editor of the *Times*, published in the *Times Literary Supplement*, London, March 13, 1937, by Mr. St John Ervine, containing biographical information, hitherto unavailable, (1) anent John Turtle Wood, an English architect who discovered the site of the Temple of Diana at Ephesus on December 31, 1869, and published in 1877 his *Discoveries at Ephesus* (see facsimile of title page below), a book deserving more fame than it has yet obtained. I have read that book; it is a straightforward, unpretentious and pleasant narrative of his ten years of excavation, from 1864 to 74, the fundamental discovery of the temple site occurring only after about half of that period had already been spent in vain efforts. The book contains also some touching details concerning the cooperation of his courageous wife, Mrs. "Ephesus" Wood.

As I read Mr. Ervine's letter and Wood's *Discoveries* "Here is a subject" I thought, "which ought to interest the readers of *Isis*. The discovery of the Temple of Diana, one of the most famous sanctuaries of the ancient world, should not it be known as well as other discoveries of that time? And the discoverer John Turtle Wood, should not we honor him, as we do his contemporaries, whether archaeologists like Heinrich Schliemann, or scientists like Dmitrii Ivanovich Mendeleev and Lothar Meyer, Gregor Mendel, Zénobe Gramme, Robert Bunsen, Marcellin Berthelot, Charcot e tutti quanti? There is no essential difference, it should be clearly understood, between an archaeological discovery and any other scientific discovery or invention."

(1) There is no notice on him in DNB.



J. T. Wood
portrait painted by M^me^ Louisa Starr Canziani.

(Courtesy of British Museum)

J. T. Wood
photograph c. 1883.
(Courtesy of Major Walter de Burley Wood*)*

I then wrote to Mr. ERVINE and to the Editor of the *Times* asking for their permission to reproduce the former's letter. That permission was graciously granted by them in their messages dated respectively April 20 and May 18, 1937.

In addition I am able to give four pertinent illustrations :

1. Thanks to the Trustees of the British Museum, WOOD's portrait painted in oils by L. S. CANZIANI (mentioned in the last but one paragraph of ERVINE's article).

The painter was Madame LOUISA STARR CANZIANI, née LOUISA STARR, who exhibited under her maiden name from 1863 to 1884, and under her married name at the R. A. since 1885. According to information kindly given to me by Mr. A. E. POPHAM, deputy keeper of the British Museum, the portrait was presented to the Museum in 1915 by the Chevalier E. CANZIANI, and Madame CANZIANI was described at that time as deceased.

2. Thanks to the courtesy of Major WALTER DE BURLEY WOOD, a photographic portrait taken about 1883.

3. The title page of EDWARD FALKENER's (1814-96) book of 1862, which did *not* contain the discovery of the Temple of Diana.

4. The title page of WOOD's book of 1877, which did contain it.

I owe these two facsimiles to the courtesy of the Harvard Library.

In a letter dated St George's eve (1937) 5 Driffield Terrace, York, Major WOOD sent me the following information which he kindly allowed me to reproduce :

"I should be pleased to send you a photograph of my grandfather. I do not enclose it with this letter because the one I have in mind, as most suited to your purpose, is packed away, and will need a day or two to recover. Perhaps you would like one of Mrs. J. T. WOOD (always known as Mrs. "EPHESUS" WOOD). She was faced with great difficulties. At one time there were 400 workmen at Ephesus — half Greeks, half Turks. There were Moslem and Christian riots almost weekly, and the injured were brought to her, the only woman, to heal.

"I do not think that it has been mentioned that my grandfather visited the U.S.A. on a lecturing tour, during which, I need hardly say, he met with every possible kindness. I can supply you with particulars of this time from an old album of newspaper cuttings which is packed away — somewhere. I recollect that in this same album are letters from JAMES RUSSELL LOWELL and LONGFELLOW, whom, apparently, my grandfather had the privilege of meeting.

"My grandmother died in 1906, the year I went to Oxford. She admonished me frequently on the subject of education, saying that no Englishman should consider himself educated until he had visited the U.S.A. I fulfilled her wishes on this point in 1912."

In a subsequent letter, dated York, June 1, Major WOOD added :

"As regards Mrs. "EPHESUS" WOOD. She was born at Minsterley Hall, Minsterley, Shropshire, on 2nd May 1831. Baptized at Minsterley Chapel (that is the private family church) on 10 July 1831 and given the names of HENRIETTA ELIZABETH. Her father was EDWARD GITTINS WOOD; her mother MARTHA NEALOR. She was married on 25 August 1853 at St Chad's Church, Shrewsbury to her first cousin one generation removed (his generation being senior) JOHN TURTLE WOOD. Although her cousin was a generation senior, he was only 10 years older than she. She died at Ventnor in the Isle of Wight on 15 March 1906, having been a widow for sixteen years.

"I remember my grandmother very well. When her only son (who died in 1889) and her husband were gone, she lived mostly on the continent, and I remember school holidays with her in Germany, Switzerland and Italy. As an old lady she resembled, in figure at least, Queen VICTORIA, and sat to the sculptor THOMAS BROCK R. A. as a model for one of his statues of the Queen. After she had retired to Ventnor, she used to drive about in a pony chaise, similar to the one used by Queen VICTORIA at Balmoral, wearing a peculiar shaped bonnet, which, I afterwards learned, was modelled on the late Queen's. She was devoted to children and often stopped the pony chaise to watch them at play, and call them over to her. Having seen so much of bloodshed and danger in Asia Minor, she had in her old age a great hatred of violence — both physically and in opinions. She tried to bribe my brother to give up playing football, and begged me never to mention football or boxing in my letters to her from school. In those days it did not seem to me that there was anything else to write about!

"She used to spend at least two hours every morning over her correspondence. As children we never ceased to wonder at the pile of letters that came every day for 'Grandma', and we loved looking at the foreign stamps. Her correspondents included SCHLIEMANN, J. R. LOWELL, FLINDERS PETRIE, GOUNOD, LEIGHTON, ROSETTI, G. A. HENTY, SARAH GRAND, and the Head waiters and Chefs of hotels at which she had lived all over Europe. This letter writing was a duty in which she never failed."

Some of these details carry us far from the history of archaeology, but inasmuch as Major WOOD was kind enough to offer them to us, I could not resist the temptation of publishing them. Indeed, Mrs. "EPHESUS" WOOD was not only the wife of the discoverer of the Temple of Diana, but a distinguished and gracious woman whose evocation in *Isis* is a blessing for our readers.

The text of Mr. ST JOHN ERVINE's letter follows :

"Sir, — Several months ago you were kind enough to publish an inquiry from me for information concerning JOHN TURTLE WOOD, who discovered the site of the Temple of Diana at Ephesus. I am happy to report that, as an immediate result of the publication of my inquiry in the *Supplement*, I received a letter from Major WALTER DE BURLEY WOOD, the only living grandson of the great archaeologist; and I am now able, with help received from Sir

Ian MacAlister, the secretary of the Royal Institute of British Architects, to give you a statement of all the major biographical information about Wood that is now likely to be discovered.

EPHESUS,

AND

THE TEMPLE OF DIANA.

BY

EDWARD FALKENER.

"The Empress of Ionia, renowned Ephesus, famous for war and learning."
Anthol. Graeca, iv. 30, § 4.

LONDON:
DAY & SON, GATE STREET, LINCOLN'S-INN FIELDS,
LITHOGRAPHERS TO THE QUEEN.
1862.

Fig. 1. — The word "Ephesus", measures 48 mm.
(Courtesy of Harvard Library)

"He was born in Hackney, in North London, on February 13, 1821, and came of Shropshire yeoman stock, with a family vault at Condover. His grandfather, William Wood, who was born

at Bayston, near Shrewsbury, in 1726, owned a considerable estate, known to his children as the Minsterley property, in Bayston, Pontesbury, Etsell and Condover. WILLIAM WOOD married ELIZABETH BURLEY and begot eight children, of whom only one, his youngest child, left Shropshire to settle in London. This was JOHN WOOD, the father of the archaeologist. He was born in 1779, and he married ELIZABETH TURTLE. JOHN TURTLE WOOD was their only child. The Minsterley property was inherited by SAMUEL, the second son and fifth child of WILLIAM WOOD, and this WOOD had two daughters, MARY EMMA and HENRIETTA ELIZABETH. The latter, who was born in 1831, married her cousin, JOHN TURTLE WOOD, in 1853, and bore him one child, EDWARD NAYLER WOOD, who was born in 1857. EDWARD married *his* cousin, FLORENCE, the daughter of MARY EMMA MASON, formerly WOOD, and had two sons by her, GEORGE FREDERIC, who was born in 1884, and died in 1922 as the result of wounds sustained at the Battle of Loos in 1915, while serving as a Lieutenant in the 8th Battalion of The Buffs, and WALTER DE BURLEY WOOD, of the Army Educational Corps, who survives. I mention these marriages because of the way in which the WOOD family, so to speak, turned back to itself. Major WOOD's grandmothers were sisters.

"JOHN TURTLE WOOD was educated privately under the Rev. WILLIAM ALEXANDER OSBORNE, Senior Classic and Senior Chancellor's Medallist at Cambridge, who subsequently became Headmaster of Rossall Hall, Fleetwood. He respected OSBORNE so much that he sent his own son, EDWARD, to Rossall to be educated under him. WOOD decided early in life to become an architect, and for this purpose he is said to have studied under a tutor at Cambridge and to have entered the office of H. E. KENDALL; but exact details of this part of his life are unobtainable. He is known to have been studying in Venice in 1850. After his marriage to his first cousin in 1853 he began in private practice as an architect at an address in Victoria Square, Grosvenor Place, London. Early in 1858, about a year after the birth of his son, he was appointed architect to the Smyrna and Aidin Railway, and in April of that year he landed at Smyrna and began to design stations on the railway line.

"His decision to take this appointment was chiefly due to the

interest in the Temple of Diana which had been aroused in him by his classical studies. He was a Greek and Latin scholar, though not profound, and long before he went to Smyrna had read all

DISCOVERIES AT EPHESUS

INCLUDING THE

SITE AND REMAINS OF THE GREAT TEMPLE OF DIANA

BY

J. T. WOOD, F.S.A.

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

WITH NUMEROUS ILLUSTRATIONS

FROM ORIGINAL DRAWINGS AND PHOTOGRAPHS

LONDON
LONGMANS, GREEN, AND CO.
1877

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FIG. 2. — The words " Discoveries at Ephesus " measure 10 cm.
(Courtesy of Harvard Library)

there was to read in the classical authors concerning the Temple. One of his objects in applying for the post on the railway was to obtain access to the site which he knew to be in the neighbourhood of Ayasoluk. It is doubtful if he would have taken an unattractive appointment if it had not been his ambition to make excavations in search of the Artemision.

"It was not until 1863 that his studies had sufficiently matured for him to begin to look for the remains of the Temple, and he was heavily handicapped by the lack of definite information on which he could act. FALKENER had speculated on the subject in his book, '*Ephesus and the Temple of Diana*', which was published in 1862, but his conclusions turned out to be erroneous. Unlike HEINRICH SCHLIEMANN, the romantic discoverer of Mycenae and Troy, WOOD was not a rich man, and it was impossible for him to make excavations on the scale on which SCHLIEMANN made his, even if the Turkish Government had been willing to let him do so. It was necessary, therefore, if the search was to be thoroughly made that WOOD should obtain a grant from some body, such as the British Museum; but he realized that any grant the Museum might make would only be granted on the production of evidence that he had qualifications for the work he was proposing to do. He, therefore, resolved, before applying for a grant, to investigate ruins already discovered, in the hope, first of finding an indication of the site of the Temple, and, second, of finding remains which would justify the Trustees in granting him any sum. To do this, he had to spend a considerable portion of his personal means, though he would not accept a penny from his wife, and none of this money was ever refunded to him.

"The story of the way in which he qualified for grants from the Trustees of the British Museum and of the adventures and misadventures he experienced in searching for the site, are set forth in his book, *Discoveries at Ephesus*, which was published in 1877. It is not without pathos. He suffered every sort of vexation and misfortune, including illness and at least one attempt on his life; and he might have failed in his mission had he not had the continual comfort and active assistance of his devoted wife, a lady of character as remarkable as his own. She endured the rigours of life at Ayasoluk, turning herself into a district nurse for the entire neighbourhood, with a courage and fortitude that some delicately bred women seem to possess without measure. On December 31, 1869, about seven years after he had begun the search, WOOD found the white marble floor of the Temple. He had started by searching in the wrong direction, and it was not until he had deeply reconsidered the facts and had also been helped by some lucky flukes, that he turned away from Ephesus itself and sought

for the site adjacent to the railway station he had designed at Ayasoluk.

"The land on which the Temple stood, some eight acres in extent, was purchased for the Trustees of the British Museum by WOOD for a little more than £160, and it remains their property. But the excavations, which cost about £16,000, had to be discontinued, partly because the Trustees were unwilling to bear any further expense in connexion with them, but chiefly because the foundations, which had always been under some water, became so flooded, as the excavations deepened, that it was no longer possible, except at very great expense, to cope with the water. Subsequent explorations, of a more scientific character than WOOD's, were made by various archaeologists, including DAVID GEORGE HOGARTH, whose 'Excavations at Ephesus' (2) is a work of major importance; but the flooding could not be stopped, and to-day the foundations are full of water. A pond, covered with scum, marks the place where one of the Seven Wonders of the World dazzled the eyes of mankind.

"WOOD, who had spent eleven years in Asia Minor, returned to England in April 13, 1874. In January and February of 1875, he gave four lectures at the Royal Institution of Great Britain 'On the discovery of the Temple of Diana and other results of the government excavations at Ephesus.' He was elected a Fellow of the Royal Institute of British Architects in 1874, and an Honorary Fellow in 1878. He was also a Fellow of the Society of Antiquaries. On March 1, 1875, the British Government granted him a pension of £200 a year. In 1882, having failed to obtain a grant for further excavations at Ephesus, he sought to raise a fund by public subscription, and, although the money raised was insufficient for his purpose, he returned to Asia Minor in 1883; but this second expedition had no results of any importance. In 1889, he lost his only child at the age of thirty-two, and this loss, though WOOD and his son had spent very little of their lives together, because of the separations which their work involved, deeply affected him. He died at 66, Marine Parade, Worthing, in Sussex, on March 25, 1890, aged sixty-nine, being survived by Mrs. WOOD and the two grandsons to whom

(2) The archaic Artemisia (British Museum 1908).

reference has already been made. She died at Ventnor, in the Isle of Wight, on March 15, 1906. Her age was seventy-five.

"WOOD, of whom there is a portrait in oils by L. S. CANZIANI, in the British Museum, where he was remembered until lately by the older workmen as a rather gruff old gentleman, was an artist of some quality, and was a frequent exhibitor in the Royal Academy. His brother-in-law was GEORGE MASON, A.R.A., the painter of 'Harvest Moon.' WOOD taught H.R.H. the Duke of CONNAUGHT to paint in water colours, and took him for a sketching tour in 1865, when his royal highness was about seventeen, and was invited to do so again the following year, but was unable to accept the invitation because of his wife's illness. His posthumous work, entitled *Discoveries on the site of ancient Ephesus*, which was included in the *By-paths of Biblical knowledge* series, adds little to the information given in *Discoveries at Ephesus*, which was dedicated to the Duke of CONNAUGHT.

"WOOD seems to have been a modest man, for he took no pains to secure his renown; but his modesty was not due to weakness of character, for a more determined man never set out on a difficult exploration than the young architect who, with small means and scarcely any data, went to Smyrna with a remarkably brave wife, to look for a lost wonder of the world, and, in spite of every discouragement, found it.

Yours,

Honey Ditches, Seaton, Devon, England.

ST JOHN ERVINE

GEORGE POST
1838-1909

UNIV. OF MICH.

The life and works of George Edward Post (1838-1909) (1)

> " And for every nation there is an appointed time, so when their appointed time is come, they shall not remain behind the least while, nor shall they go before."
> KORAN (*Al-a'ra'f*), Chap. VII, 32.

To reach a just estimation of the life and work of GEORGE EDWARD POST, American Medical Missionary to Syria in the nineteenth century, it is necessary to survey briefly the history of American Protestant Missions through which influence the flow of western culture was quickened in the Nearer Orient.

Surprising, at first glance, is the fact that missionaries from America took back to the birthplace of Christianity, in rehabilitated dress, the faith which came to them from that same land nineteen centuries ago.

At the beginning of the nineteenth century Syria was a province of the Ottoman Empire. It was ruled by Turkish governors who were often in conflict with the central authority in Constantinople. In 1832 Syria was invaded by IBRAHIM PASHA, the son of MUHAMMAD ALI. Following the withdrawal of the armies of IBRAHIM PASHA in 1841 a period of anarchy and chaos ensued. The country could hardly claim the possession of any institution of higher learning. Travel was difficult and trade was unde-

(1) I am indebted to Dr. POST's three surviving children, Mrs. ALFREDA CARHART, Dr. WILFRED M. POST, and Dr. BERTRAM VAN DYCK POST for much of the material incorporated in this paper relating to the life of their father. I am also indebted to Dr. GEORGE SARTON, who not only inspired my study of the life of POST, but supplied, last summer, photostatic copies of the title pages of POST's work from the British Museum, and also wrote the bibliography appended to this study. Acknowledgment is due, also, to my teacher and friend, Dr. WILLIAM T. VAN DYCK, for exerting himself to contribute, at my request, sundry items of information not generally accessible.

veloped. In many sections of the country there was a traditional and smoldering enmity between different religious sects. The country was still largely in the feudal stage (2).

To the Protestant church of the eighteenth century the Arabic-speaking world presented no attraction or appeal (3).

During the second decade of the nineteenth century, however, a wave of religious " revival " and missionary enthusiasm swept over New York and the neighboring States. Many men offered their services to the American Board of Commissioners for Foreign Missions (or more briefly the A. B. C. F. M.), to spread Protestantism in Syria.

The history of the American Mission in Syria dates back to 1819 when PLINY FISK and LEVI PARSONS went to Palestine. FISK's missionary life covered six years, most of which was spent in Beirut where he died in October 1825. He was the pioneer missionary of Syria (4).

American Presbyterians co-operated with the Congregational Church for many years, both before the Presbyterian Board of Foreign Missions was organized in 1837, and afterwards. When readjustment between denominations took place in 1870, Syria was assigned to the Presbyterian Church, the Congregational Church continuing its interests in Turkey, while Palestine became primarily the field of the Church Missionary Society of England.

Meanwhile Rev. WILLIAM BIRD and Rev. WILLIAM GOODELL landed in Beirut October 16, 1823. Opposition and the unsettled

(2) For a more detailed account of the socio-political and educational status of the Arabic-speaking people at the beginning of the nineteenth century, the reader is referred to the article entitled : AL HAKIM C. V. A. VAN DYCK, *Isis*, 27, 20-45.

(3) It is recorded that RAYMOND LULL (1235-1315) was the first Christian Missionary to the Muhammadan world. This romantic Missionary, with indefatigable zeal, attempted the conversion of the Arabic-speaking world to Christianity. For that purpose he dedicated nine years to the study of Arabic. Upon different occasions he visited North Africa. While there he resumed his crusade against Islam with more eagerness than tact, thus raising the fanatical spirit of the inhabitants. As a result, he was stoned outside the city wall of Bougie, and died of his wounds June 29th, 1315. See SARTON's *Introduction* (vol. 2, 900-14).

(4) In 1826, the first and only native convert to Protestantism, [at that time] ASAAD ES SHIDIAK, was starved to death in the Maronite Monastery of Kannobin, by order of the Maronite Patriarch.

JESSUP, HENRY H., *Fifty-three years in Syria* (New York, 1910), vol. II, page 809.

condition of the country made them withdraw after five years as far as Malta, where the American Board had established a printing press and whence it was sending out Christian literature. By 1830 they returned to Beirut, and soon the American Press was also transferred thither, where it still remains (5).

The American Protestant Mission in Syria in the fourth decade of the nineteenth century found itself enriched by the following men of learning: JONAS KING, the linguist; ISAAC BIRD, the historian; Rev. Dr. ELI SMITH, the pioneer translator of the Bible; Dr. WILLIAM M. THOMSON, the explorer and author; Dr. C. V. A. VAN DYCK, the humanizer of science to the Arabic world, and translator of the Bible; Dr. HENRY A. DE FOREST, the first to establish a boarding school for girls; Rev. SIMEON H. CALHOUN, "The Saint of Mount Lebanon."

On March 31, 1848, a native Evangelical church was established in Beirut. In the years which have since elapsed, many other Protestant Churches have been organized in Syria, and after the Presbyterian Board took over the Syrian Missions, these were grouped in Presbyteries. The total church membership of the American Mission in 1856 numbered about three thousand individuals.

On December 12, 1855, a sailing bark of three hundred tons, named the Sultana, left Boston harbor. Among its passengers the Sultana carried seven missionaries. Two of these, Mr. and Mrs. DANIEL BLISS, were destined to play a major rôle in establishing the Syrian Protestant College. They arrived in Beirut February 7, 1856.

Protestant Missionary Schools had been early begun (1830) in Beirut, for girls as well as boys. Abeih College was established in 1846 by Dr. CORNELIUS VAN ALEN VAN DYCK with the assistance of BUTRUS AL-BUSTANI. In 1860 an English school for girls was established by Mrs. BOWEN THOMPSON, and in 1861 the American Protestant College for girls. There was also a Mission Seminary under the care of Mr. STORY HEBARD.

(5) Having celebrated its centennial in 1932, this great printing establishment is responsible for the circulation of the Bible in Arabic—one of the world's most widespread languages—and for the publication of many other scientific and literary publications throughout the Arabic-speaking world.

Syrian Protestant College

The American Missionaries had long desired an institution for higher education in Syria, and had begun about 1862 to take definite steps toward the establishment of a College which should give in Arabic :

1. A four year course in Arts and Sciences, modeled more or less after the curriculum of American Colleges, and qualifying for the degree of Bachelor of Arts.

2. A four year course in Medicine and Surgery to qualify for the degree of M. D.

The institution was to be called the Syrian Protestant College, and Dr. Daniel Bliss had been appointed by the Mission to visit America and Great-Britain in order to arouse interest in this project, and to raise money for its realization.

" Acting on the vote of the Mission Mrs. Bliss and myself, with our children, sailed for the United States on August 14, 1862, landing in New York September 17. Soon after our arrival the annual meeting of the A. B. C. F. M. was held in Springfield, Mass.

" I was appointed to speak on a resolution in regard to reinforcing the Missions, and the late Honorable William E. Dodge was to be the next speaker. As I had had no rest from the long journey from Syria, my haggard appearance seemed to enforce upon the mind of Mr. Dodge what was said of the magnitude of the work and the necessity of re-inforcing the over-worked missionaries. When he spoke he used words to this effect : ' When our young brother was speaking I was so moved that there was not a dry thread in the shirt on my back.' Mr. Dodge was unknown to us except by name at that time, but he invited Mrs. Bliss and me to dine with him at the Massasoit House. We had a private table—the company consisted of Mr. William E. Dodge, Mrs. Dodge, their son, Reverend D. Stuart Dodge, and his wife. During the dinner Mr. Dodge asked Mrs. Bliss if her husband had come home on account of his health, and she assured him that his health was perfect, then stated in a general way the plans for the proposed college. The conversation soon became more general and the needs and objects of the enterprise were more fully explained. Before we rose from the table Mr. Dodge said to his son, ' Stuart, that seems to me to be a good thing; we must look into it.' Subsequent events revealed the results of his remark. The fountain of benevolence in Mr. Dodge's heart was not enlarged, but a new channel was opened for his benefactions." (6)

The Syrian Protestant College was organized and endowed as an independent institution having no organic connection

(6) Bliss, Frederick Jones, *The Reminiscences of* Daniel Bliss (New York, 1920), p. 105.

with the Syrian Mission, although the Mission was largely represented on its Board of Managers.

"DANIEL BLISS remained in the United States for two years. He travelled nearly 17,000 miles, giving 279 addresses and calling upon many people. He did not visit his own family until after he had raised a hundred thousand dollars for the College.

"It seems almost unbelievable that the charter was obtained and the money raised during the critical days of the civil war. Because of this war, the American money temporarily lost its value. Rather than to spend the dollars at a disadvantage, Dr. BLISS went to England, where he raised an emergency fund in sterling, which supported the College, until the dollars regained their gold value." (7)

Until 1873 the College was housed in two very insignificant buildings, with two smaller buildings attached in which a clinic was commenced and a hospital of three or four beds. In 1873 the College was moved to its present campus.

The department of Arts and Sciences was opened in 1866 with an enrollment of sixteen students, and the Medical department followed a year later.

Dr. BLISS at the laying of the cornerstone of the central building in 1871 said:

"This College is for all conditions and classes of men, without regard to color, nationality, race or religion. A man, white, black, or yellow; Christian, Jew, Muhammodan or heathen, may enter and enjoy all the advantages of this institution, and go out believing in one God, in many Gods, or in no God. But it will be impossible for any one to continue with us long without knowing what we believe to be the Truth and our reasons for that belief."

The institution which began as the Syrian Protestant College in the early days of the Civil War became the American University of Beirut shortly after the World War. It had outgrown its name. No longer was it a Syrian institution, for its student body had become one of the most cosmopolitan in the world. Forty nationalities were enrolled, representing the Near and Middle East, North and South America, and Europe. No longer could it be considered Protestant because the student body and faculty included every religious sect in that complicated region—in fact about one-half of the students in attendance today are

(7) DODGE, BAYARD, *Al-Kulliyah Review*, vol. 4, No. 1, Oct. 17, 1936, Beirut, Syria.

Muslims. No longer could it be called a college, because, in addition to the School of Arts and Sciences, there were well developed Schools of Medicine, Pharmacy, Dentistry, Nurses' Training, and strong Departments of Engineering, Commerce, and Music. The University is now affiliated with the Near East School of Theology, the Junior College for Women at Beirut, and International College.

The five rented rooms have changed into over seventy acres and forty-two buildings. The group of fourteen teachers has grown to be a staff of some 280 men and women. The enrolment of sixteen students has expanded to a total of nearly fifteen hundred. The fund of a hundred thousand depreciated dollars has become an endowment of almost five millions.

In 1903 HOWARD S. BLISS succeeded his illustrious father as the second President, and his daughter, MARY BLISS, succeeded her mother when she became the wife of BAYARD DODGE, the third President. Over a span of seventy-three years, the University has had only three Presidents. (8)

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The first man to teach surgery in this infant Medical School was GEORGE EDWARD POST, who joined the faculty in 1867.

GEORGE EDWARD POST was born in New York City December 17, 1838. His father Dr. ALFRED C. POST, a distinguished surgeon, was for a number of years professor of surgery in the University Medical College of New York. He was a descendant of RICHARD POST, who moved from Lynn, Mass. and settled in South Hampton, Long Island in 1640. GEORGE POST's mother was HARRIET BEERS.

GEORGE POST was a good student in his youth and began to study Latin at the age of six. He read a great deal as a boy and was fluent in conversation. From earliest boyhood he planned to be a Missionary, and at the age of fifteen decided to devote his life to Medical Missions, but kept his decision a secret for several years.

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(8) STAUB, ALBERT W., *Renaissance of the Near East, World Affairs Interpreter.* an. 1937, Los Angeles, California, U. S. A.

In 1854, at the age of sixteen, he was graduated with honors from the old " Free Academy " now " The College of the City of New York," and received his master's degree three years later. The next year he entered the Union Theological Seminary, taking the full course. But, as was occasionally done at that time, he carried on a portion of his medical studies during the years he spent at the seminary, and was graduated from the New York University Medical College in 1860; he was ordained by the Fourth Presbytery of New York, January 5, 1861.

From 1861 to 1863 Dr. Post served as Chaplain of the 15th Regiment of New York Volunteers, and was also rendering aid as a surgeon and often going within the firing lines to extract bullets from the wounded. A blue flag with the name " Bethel " in white letters floated over his tent which served as an invitation to soldiers of all Faiths. It is said of him that he was especially interested in temperance work among the soldiers. During his two years of Civil War service he was able to study at the Baltimore College of Dentistry, which graduated him in 1863 as a Doctor of Dental Surgery.

***

Dr. Post was sent to Syria as a Medical Missionary by the " A. B. C. F. M." Nov. 28th, 1863. He was stationed at Tripoli and began at once both medical work and the study of Arabic. Of the foreigners who come to Syria when they are full grown, few acquire a really good command of Arabic as regards vocabulary, idiom and pronunciation. Dr. Post was one of the few. He gave his mind seriously to the matter as regards both common colloquial speech and the grammatically intricate written language, and he succeeded admirably; but in this connection an interesting detail is worth recording. In those days, communication between one town and another, in Syria, was much less frequent than it is now; and although colloquial Arabic is essentially the same dialect throughout the country, there were very noticeable differences of pronunciation or accent between the natives of one district and those of another. Inevitably, Dr. Post began by acquiring the characteristic Tripolitan accent; and although he resided in that region only a short time, it is noteworthy that

a perceptible trace of its distinctive accent remained with him for many years after he had left Tripoli and settled permanently in Beirut. He remained in Tripoli for five years when his health failed, necessitating a visit to the United States. The following year he received his professorship in surgery and botany at the Syrian Protestant College in Beirut.

To teach medicine and surgery without a hospital was obviously out of the question. A small house in the immediate neighborhood was hired and a daily dispensary service for out-patients was begun, in order to provide some clinical material. In the same house, also, a few beds were put up, in two or three of the rooms, so that, on occasion, a very limited number of applicants might be admitted as in-patients, either for surgical operation or for purposes of closer study and more effective treatment. For such cases the students took turns in acting as nurses. All this, however, was a mere temporary makeshift, pending the establishment of a commodious and well equipped hospital.

Now, it so happened that during the early sixties of the nineteenth century the Knights of St. John had built, at Beirut, on an excellent site near the west end of the town, a fine and spacious hospital. In this "Prussian Hospital," as it was commonly called, the Directress and nurses were German Deaconesses of the Kaiserswerth Sisterhood, and the medical officer in charge was a German physician, Dr. LORANGE, descendant of French Huguenots who had emigrated to Germany after the revocation of the Edict of Nantes. This arrangement did not work well: there were clashes between Dr. LORANGE and the Deaconesses; complaints were made by both parties; the Knights upheld the Deaconesses; and the upshot of the matter was that Dr. LORANGE's connection with the Hospital came to an end.

This was an extraordinary opportunity for the Syrian Protestant College, and it was promptly seized. The College offered to the Knights of St. John the gratuitous services of its medical faculty in exchange for the privilege of using, for the instruction of medical students, the clinical material afforded by the out-patient department of the hospital and by the public wards of its in-patient department. The Knights were disposed to favor this proposal, and Dr. POST was sent to Berlin to represent the College in the discussions required for settlement of the details

of the agreement that was reached in due time to the advantage of all parties concerned. This agreement continued in force until America joined the Allies against the Germans towards the close of the Great War of 1914-1918.

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Surgery

Surgery was Post's chosen vocation, and for it he had conspicuous natural aptitude. He was a bold, skillful and resourceful operator, very dexterous in his manipulations, and he enjoyed his work.

He began surgical practice in the early sixties of the nineteenth century, long before the teachings of Pasteur and Lister had made any noteworthy impression on surgery. About 1877 (possibly a year or two earlier), he began to use Listerian methods, i.e. to operate under the carbolic spray and to apply elaborate antiseptic dressings. Subsequently, he continued to practice antiseptic surgery in a modified and simplified form for a number of years. As to rigorous aseptic methods, it is doubtful whether he ever fully mastered the subject or assimilated the technique. This is not surprising, for he had no practical acquaintance with the refined methods of scientific bacteriology. Like most medical men of his generation he had no training in the methods of practical microscopy, and was not expert in the use of the microscope for medical purposes.

Dr. Post was a very skillful lithotomist. Up to the year 1900 he had done at least 700 lithotomies. (9)

A record of his operations for urinary calculi is to be found tabulated in the *Medical Record* of July 28, 1877, and October 30, 1880, and also of July 6, 1907. In the latter article he describes the Italian operation as being the median perineal. He says, " Many of the smaller stones were removed through very short incisions, too small to permit the entrance of the finger into the bladder. Many of them healed by first intention and in few of them was there any noteworthy hemorrhage."

(9) Post, Wilfred M., Personal communication to the author. Jan. 11, 1937.

The Arabic operation is made by introducing one or two fingers into the rectum, prying the stone downward so as to make it prominent in the perineum, and cutting down on it with a razor. The sphincter is frequently cut in this operation, leaving a fistula which is often incurable. (10)

Tables of vesical calculi removed by Perineal Lithotomy, and vesical calculi removed by Suprapubic Lithotomy and Litholapaxy in the male, stones extracted from Urethra in male including prostatic and prostaticovesical stones; also stones extracted from the female bladder, and stones in the kidney and ureter are described in this article. It is no wonder the collection of vesical calculi now in the Surgical Museum of the American University of Beirut is so extensive, although, undoubtedly, it has received additions since Dr. POST's time. However, by far the greater number of stones exhibited there were removed by Dr. POST.

" In his day tubercular lymphnodes were uniformly removed and so great was his speed and dexterity in removing these, that he could make a complete dissection of both sides of the neck as rapidly as most operators would make of one side. His work was all done with the scalpel and with very little hemorrhage (11)."

POST did not limit his surgical practice to what we today call a specialty practice, but reached almost every branch of general surgery as practiced then. That he even operated on the eyes is revealed by the following account :

Dr. POST was particularly successful with cataract and entered with dramatic enjoyment into each new cure. " One snapshot of memory recalls an aged pastor from Asia Minor, who had become blinded by cataract and was operated upon by Dr. POST. It was the habit of the doctor to conduct a 5 o'clock Sunday afternoon service in the largest ward in the hospital. To this service the pastor was led, eyes still bandaged, by a little boy patient who seated his charge and then settled down with the other children on the floor. Girls from the German orphanage sang in beautiful harmony and as the pastor listened his face glowed.

(10) POST, GEORGE EDWARD, *Operations for Urinary Calculi*, reprint of an article from the *Medical Record*, July 6, 1907, WILLIAM WOOD & Co., New York.

(11) POST, WILFRED M. Personal communication to the author dated Jan. 11, 1937.

A few days later the doctor removed the bandage and a look of rapture broke over the pastor's face as he realized he could see (12)."

* * *

Materia Medica

As far as surgery and botany were concerned, Dr. Post found his work as a teacher sufficiently congenial. Unfortunately, however, the working of such an institution as the Syrian Protestant College involves, of necessity, the performance of a great deal of unpleasant work—hard, uncongenial, distasteful drudgery—and every member of the faculty had to take his share of it.

At that time Arabic was the medium of instruction in all departments of the College; men competent to teach medical subjects in Arabic were few and far to seek, and their number could not be added to at short notice. One of the subjects that had to be taught by someone was " Materia Medica "—the bugbear of both teachers and students in those days when Pharmacology, the scientific study of the action of remedies, had not even reached the stage of infancy, being as yet in the embryonic condition of development. Who was to occupy the uncomfortable chair of Materia Medica at the S. P. C.? The exigencies of time, place and circumstance marked Dr. Post as the victim, and he undertook the inevitable task with energy and resolution. After he had been teaching this subject for a good many years, he remarked to one of his former pupils, " When I cut into a patient, I see my knife and what I am doing with it; I see what is wrong at the seat of disease, and what can be done to set it right; and when the operation is over, I know just what I have done; but in working with your pills and powders and potions, there is too much guesswork for me !"

* * *

(12) Carhart, Alfreda Post. Personal communication to the author, Nov. 20, 1936.

Botany

Botany was his avocation, his " hobby ". Because he was threatened with pulmonary desease in childhood he was advised to spend much time out of doors. It was in this way that he became interested in botany and it continued to be his hobby all through life. He began very soon to collect methodically the plants of any part of the country in which he might happen to find himself. The outcome of this line of work was the publication in 1896 (or thereabouts—the book is undated) of his " Flora of Syria, Palestine, and Sinai," The botanical collection, or " herbarium," which Dr. Post made, and which is now preserved in Post Hall of the American University of Beirut is a large one; it consists of pressed and dried plants, named and classified, representing the flora of a large part of the Mediterranean Region.

In this work he did not give much attention to the morphology and physiology of plants—aspects of the science which were still in their infancy. But in systematic botany he found a pursuit of absorbing interest.

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Architecture

Dr. Post was always interested in the planning and construction of edifices of various kinds—private houses, college buildings, hospitals, museums, etc. He designed his own residences in Beirut and Aleih, and superintended the building of Post Hall on the Campus. " It was chiefly his long and intimate acquaintance with Dr. Post that led Mr. Jessup to erect and endow for the A. U. B., the hospitals for women and for children, and the training school for nurses now under the title of " The Maria De Witt Jessup Foundation." Dr. Post's architectural skill, his capacity for dealing with native contractors and laborers, and his unflagging energy were constantly called into exercise in the construction of these hospital buildings (13)."

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(13) Dodge, Rev. Stuart D. *The Presbytery*, and Dr. Post, *New York Observer*, Dec. 30, 1909.

Personal Characteristics

Post was strikingly energetic, an indefatigable worker; very strong of will, very persevering and tenacious of purpose; very masterful in his dealings with those who were in any way under his authority. " He was autocratic and disconcertingly direct in manner (14)." By nature he was hot-tempered, but, as a rule, he had very good control of himself. The following episode illustrates strikingly the presence of mind which he possessed.

In the early days, while conducting a little Sunday service in a Lebanon Village, some ruffians climbed over the wall of the place where the service was being held, trying to break up the meeting; apparently they meant mischief for one of them had a dagger in his hand and put it between his teeth as he climbed down the inner face of the wall. As he leaped to the ground the dagger fell from his mouth and Post rushed forward, seized it, bowed low to him and handed it to him handle forward, making some graceful Arabic quotation, appropriate to the occasion. While some of the audience screamed and others held their breath, the ruffian thoroughly confused and abashed, accepted the dagger, put it in its sheath, climbed the wall again and disappeared, and the service proceeded.

Post became one of the leading factors in the organization and development of the Medical department. He was instrumental in the official recognition of the Medical School by the Imperial Ottoman authority.

Throughout the nineteenth century (and up to the close of the Great War) Syria was a province of the Ottoman Empire, and one of the most serious preoccupations of the Faculty of the S. P. C. during its early years, was to induce the Turkish Government to grant some kind of official recognition to the graduates of its Medical department. Protracted negotiations with the Authorities concerned at Constantinople, conducted through the American Minister to Turkey, were not very successful, so that it was deemed expedient that a member of the Faculty should go to Constantinople as the accredited representative of the College, and that he should remain there as long as might be necessary

(14) *Dictionary of American Biography* (New York, 1935), Vol. 15, p. 116.

in order to secure the desired recognition. For this important and delicate mission, Dr. POST was chosen by his colleagues, and he finally succeeded, after considerable delay and repeated interviews with the officials concerned, in bringing the matter to a satisfactory issue; the Medical department of the S. P. C. was officially recognized by the Turkish Government to the extent that holders of its diploma were entitled to present themselves for examination at the Imperial Ottoman School of Medicine, at Constantinople, and, if successful in passing that examination, each of them was given an official Ottoman diploma conferring upon him the degree and title of Doctor of Medicine, giving him the right to practice Medicine and Surgery in any part of the Empire, and rendering him eligible for any civil or military appointment or post under the Government. Later (about 1905) a still more satisfactory arrangement was reached —again with Dr. POST's help—whereby the Imperial Ottoman Medical School at Constantinople undertook to send to Beirut, year by year in the month of June, a jury consisting of three of its Professors delegated and authorized to examine the students of the graduating class in the Medical Department of the S. P. C., and to give to each successful candidate a provisional memorandum or certificate. This memorandum, when forwarded in due course to Constantinople through the American Embassy, was exchanged for the regular diploma of Doctor of Medicine, issued to the holder without further formalities, by the Imperial Ottoman School of Medicine, and transmitted to him through the medium of the Embassy at Constantinople and the Faculty of the S. P. C. at Beirut.

As a teacher he was enthusiastic and inspiring, impressive in manner, clear in explanation and rich in illustration. I shall quote the following impressions from a letter by one of POST's former pupils, an eminent doctor of medicine, who now resides in the Near East.

"As a teacher, I found Dr. POST more informative than educative, more authoritative and positive than persuasive or convincing. During my time as a student, his method in the class-room was to assign a lesson of a certain number of pages of the text-book; then, the next time the class met for recitation, he would expect his pupils to repeat paragraph after paragraph of the lesson as

nearly as possible in the exact words of the book, which he always had open before him during the entire recitation. As long as the student who was reciting continued to speak fluently and without hesitation, Dr. POST seldom put any cross-questions. Members of the class were allowed to ask questions concerning the subject of the lesson, but DR. POST was very impatient of having his own opinion called in question or criticized; it went very much against his grain to acknowledge, under any circumstances, that he was mistaken, or to reply to any question with the direct acknowledgment: "*I do not know.*" It may be that his attitude in such matters was modified as he grew older; I cannot say; I speak only of the period when I was myself one of his pupils. It should be noted, in this connection, that Dr. POST suffered from a certain degree of hardness of hearing, which was, at times, an annoying handicap to him in the classroom, especially in dealing with students whose utterance was low or indistinct."

His deafness increased with his years, but his students gave him little trouble in their recitations or answers as they acquired the habit of shouting at him at the top of their lungs. Once, his son, Dr. WILFRED POST asked him if they did not deceive him by prompting one another in class or examination.—"No," he said, "I do not always hear their words but I can tell when they are prompting by the undulations of their moustaches."

He was referred to by many of his students as the "father of surgery" in their land and often students and teacher worked together. A high tribute to his power of organization is the following account:

During the early years of the S. P. C., a good many of the medical students were young men of very limited means, and the College helped a number of them to pay for their education by doing some kind of regular work for the Institution. At that time no "concordance" of the Arabic Bible had been prepared, although the need of one was much felt by missionaries and preachers. Now, Dr. POST was an ordained Minister of the Gospel as well as a Doctor of Medicine, and he undertook to direct and supervise the compilation of such a book, setting a number of students to work upon it. On a long narrow table were laid twenty-eight piles of loose sheets of paper, in two rows, each pile representing one letter of the Arabic alphabet.

One student sat at the head of the table and read out slowly verse after verse of that portion of the Bible which had been reached in due course. The other students stood or sat along the sides of the table, each one of them being responsible for a certain number of the letters of the alphabet—say, five or six—taken as the initials of the words occurring successively in the text, and his business was to write down in due order, on the appropriate sheet of paper, each important word in the text read out by the reader, whose initial letter lay within his particular field, together with its exact position in the Bible—i.e., in what "Book," chapter and verse—and its immediate context. It was a long, slow tedious business, which occupied half a dozen men, or more, for several years. As already stated, all this was done under Dr. POST's general direction; but when the students had once mastered the method employed, it became largely a matter of routine, so that they could be left very much to themselves.

Organizing the Medical School of the S. P. C. called for medical books in Arabic, and of these there were very few. Accordingly POST set himself to the serious task of preparing (in Arabic) textbooks of Surgery, Botany, Materia Medica, and other subjects. The Surgery was based upon a handbook of the subject by ROBERT DRUITT; the Botany was an adapted and somewhat modified translation of ASA GRAY's well-known elementary book "How Plants Grow;" and the Materia Medica was based on an English manual by ALFRED BARING GARROD (15).

However, he not only concerned himself with the undergraduate work, but extended his activity to postgraduate publications, as it was mandatory in helping his pupils to keep up-to-date in scientific progress.

When the S. P. C. had been in operation for eight or ten years, it had a considerable number of medical graduates at work in different parts of the country. Most of these young doctors were successful in their practice, some of them even conspicuously successful, but their former teachers saw with regret that very few of them were making any effort to keep abreast of the progress of medical science: they seemed to think that what

(15) For a full list of his scientific publications the reader is referred to a Bibliography presented by Dr. SARTON and appended to this article.

they, as undergraduates, had learned of medicine and surgery, was final and unchangeable; consequently, they tended first to stagnate, then to deteriorate, and, finally, to become little better than living fossils, from the professional point of view, even before reaching middle age. This disappointing apathy was due, without doubt, to various causes; but Dr. POST was inclined to ascribe it more especially to two facts:—(1) There was no periodical or progressive medical literature in the Arabic language; (2) One of the requirements for admission to the Medical Department of the S. P. C. was a fair knowledge of at least one European language; but, as a matter of actual fact, very few of the medical graduates had a good enough command of any foreign language to enable them to read its medical literature easily and with adequate comprehension. Under these circumstances, Dr. POST decided to undertake the task of publishing, in Arabic, a montly medical journal entitled " At-Tabib " (" The Physician "), for the printing and circulation of which he obtained the necessary official permit in his own name as proprietor and responsible editor. Over and above all the other demands upon his time and strength, he was now obliged to write or otherwise to procure, by hook or by crook, month after month, the material required to fill a certain number of pages of this periodical. It was too much for one man to do unaided; accordingly, he delegated certain departments of the work to one of his former pupils, who was now a teacher at the S. P. C.

To any disinterested person with experience of these matters, it must have been obvious that such a venture as this could not possibly succeed from the financial point of view : there was not in the whole country a large enough number of Arabic-speaking medical men, even supposing that every one of them became a subscriber, to pay the printer's bill; nor could one count upon the income from advertisements to meet the deficit, for, in those days, there was scarcely anything to advertise in the medical line. Financial bankruptcy was inevitable. By strenuous efforts and at a considerable personal sacrifice, Dr. POST managed to keep " At-Tabib " going for a few years, but he was finally obliged to give it up. He even tried the experiment of putting it wholly into the hands of one after another of his former pupils

(now independent practitioners), but they were even less successful than their teacher had been, so that, at length, " The Physician " came to a natural and inevitable end.

This illustrates POST's personal quality of perseverance and tenacity of purpose. Not only was he strict and exacting in his scientific work but he was particularly so in money matters, and was commonly reputed to be " grasping " (16). This reputation was due in large measure to the fact that, as a matter of principle as well as natural habit, he insisted upon getting his full rights in any transaction; thus if he made a bargain or entered into an agreement with any person, he required that that person fulfill to the last letter the terms of the agreement. He had a good sense of humor, which at times was somewhat sardonic. His command of the English language was very unusual—he was a good orator, choosing his words well, constructing his sentences correctly, and presenting his subject clearly. His professional skill won him a multitude of friends among all classes and religious sects. Some of his patients were people of distinction. One of these was the Emir ABDUL-KADIR, Prince of Algiers, who, after resisting the armies of France for fifteen years, surrendered to the French General LAMORICIÈRE, and took a solemn oath of loyalty to France. He was then retired in 1852 by LOUIS NAPOLEON in honorable exile to Damascus, the city of his choice, with a princely pension.

Another was RUSTUM PASHA, the famous " Just Governor " of Lebanon (1871-1881), who had his left hand badly torn while filling cartridges for a fowling-piece. Dr. POST tended the hand and succeeded in saving all but two fingers. The Pasha's gratitude knew no bounds. On his recovery he visited the College, studied all its departments and by official correspondence with his old friends, the Turkish Ministers in Constantinople,

(16) SARKIS, JOSEPH ELIAN, *The Arabic Bibliography* (Cairo, 1928-30), Col. 602.

" Dr. WILFRED M. POST, son of GEORGE E. POST, considers this to be too harsh a statement. He declares that his father was decidedly 'Scotch' in small financial matters, sometimes to the embarrassment of his family; on the other hand most of his services were to the poor who paid him nothing and had he remained in America he could have amassed a large fortune by his surgical skill. However he often stated that the large amount of time he gave to free service was a sacrifice which was part of his work and which he gladly made."

did all in his power to further the interests of the College and all American Schools (17).

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Religious Zeal

Post was a loyal Presbyterian and a true Christian missionary and was as enthusiastic for evangelism as he was for surgery, although the latter, of course, occupied the bulk of his time. He was more conservative than liberal, and much more strongly inclined to be orthodox (in the ecclesiastical sense) than to be tolerant toward the beliefs of others. Rev. S. M. Zwemer in his book "Arabia the Cradle of Islam" commends Post's attitude toward Islam at the Chicago Parliament of Religions, saying :

"When Muhammad Webb, the latest American champion of Islam spoke at the Chicago Parliament of Religions in praise of the Koran and its teaching, Rev. George E. Post, M. D., of Beirut deemed it a sufficient reply to let the book speak for itself. He said, 'I hold in my hand a book which is never touched by two hundred millions of the human race with unwashed hands, a book which is never carried below the waist, a book which is never laid upon the floor, a book, every word of which, to these two hundred millions of the human race is considered the direct word of God which came down from heaven. I propose, without note or comment, to read to you a few words from the sacred book and you may make your own comments upon them afterwards.' After quoting several verses to show that Muhammad preached a religion of the sword and of polygamy, he added : 'There is one chapter which I dare not stand before you, my sisters, mothers, and daughters, and read to you. I have not the face to read it; nor would I like to read it even in a congregation of men. It is the sixty-fourth chapter of the Koran.' (18)

(17) Jessup, Henry H., *Fifty-three Years in Syria* (New York, 1910), vol. 1, p. 399.

(18) Zwemer, S. M., *Arabia the Cradle of Islam* (New York, 1900), p. 186. The only part of Chapter 64 of the Koran which relates to women and children is quoted below :

"O true believers, verily of your wives and your children he gave an enemy : wherefore beware of them. But if ye pass over their offences, and pardon and forgive them : God is likewise inclined to forgive and be merciful. Your wealth and your children are only a temptation : but with God is a great reward. Wherefore fear God, as much as ye are able; and hear, and obey; and give alms, for the good of your souls; for whose is preserved from the covetousness of his own soul, they shall prosper. If he lend unto God an acceptable loan, he will

His son, Dr. WILRED POST, says to the same effect, " My father was no admirer of MUHAMMAD, but he was careful, in his Sunday preaching or in casual conversation, never to say anything against him (19)." Although this may have been true when Dr. POST was in Syria, apparently it was not inspired by a deep-seated tolerance and respect for other beliefs. That may be, as one of Dr. POST's former pupils believes, the result of the inability of most of those who are alien to Islamic tradition to understand the totality of the social evolution of the thought and customs of the Arab.

" I wish to say, in justice to Dr. POST, that, as far as my observation and experience go, a great many occidentals seem to be incapable of understanding, and of appreciating at their true value, the teachings of the Koran as regards marriage, divorce, polygamy, the social, economic, and political status of women, etc. They cannot see that the Islamic ethical code was especially adapted to the time, place, and circumstances under which it was promulgated and to the peculiar character of the people among whom it took its origin,—their history, customs, traditions, temperament and degree of psychic development; they do not recognize, and they cannot appreciate, the magnitude and the spiritual significance of the advance, the upward progress marked by that code—its immense superiority as compared with the beliefs and practices that prevailed in Arabia before the time of MUHAMMAD

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double the same unto you, and will forgive you : for God is grateful and long suffering, knowing both what is hidden and what is divulged; the Mighty, the Wise."

" It is possible that POST critically judged the verses relating to wives and children as being derogatory to the family social status. MAULVI MUHAMMAD ALI is in a better position to understand the subtle meaning, hence I quote the following from his well-known translation of the Koran. " Because it is most often for the sake of one's wife and children that one acts wrongfully towards others—thus, in some cases the wife or the children become an enemy to man. Note the use of the word *min*, which shows that wives and children do not necessarily lead man to evil, but that sometimes he inclines to evil on account of them. The next verse speaks of one's possessions and children as a *fitnah*, or *trial*, because through these the light of the sincere is manifested or the weakness of the frail becomes clear as the noon-day sun."

ALI, MAULVI MUHAMMAD, *The Holy Qur-an*, Arabic text with English translation and commentary (Lahore Punjab, India, 1920), page 1084.

(19) POST, WILFRED M. Personal communication to the author dated Jan. 11, 1937.

and, indeed, after his time in the more remote or inaccessible parts of that great peninsula; nor do they grasp the fact that many things *permitted* by Islamic law or custom are not *commanded* by it, and that various *abuses* have become customary in certain communities of Muslims for which their religion is not at all responsible, just as there are many detestable abuses among Christians of various sects for which Christianity is by no means responsible. Many of these critics of Islam know very little about it at first hand, i.e., of their own direct knowledge; consequently, they misunderstand it and misrepresent it, and their misunderstandings and misrepresentations are propagated from one to the other of their writers and teachers uncritically and, only too often, with a more or less marked bias or prejudice which is apt to develop, under the pressure of sectarian partisanship, into overt hostility. In view of these facts, Dr. POST's attitude towards the Koran may be looked upon as one example among many, and so loses much of its personal importance."

Dr. POST's son further states that, occasionally some of the missionaries would feel that the time had come to make forensic attacks upon Islam and bring all the pressure of religous arguments to bear in order to make the Muslims change their religion, but his father never approved of these tactics and would say: "We wish the Muslims to become Christians, we desire them to give up their polygamy and abolish the veil, but before we can make them Christians, we must make them friends. It is not our doctrines, but our lives, which will conquer Islam."

POST was a constant contributor to the *Sunday School World* and to *The Evangelist*. He became even better known to the missionary world through an address that he gave at the Missionary Conference in London in 1888. (19*a*)

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(19*a*) "Dr. WILFRED M. POST doubts the accuracy of this quotation. This chapter of the Koran contains nothing especially shocking and he thinks chapter 33, in which the Almighty is represented as bestowing special polygamous priveleges upon the Prophet not granted to the ordinary believer, was more likely the one his father referred to; or it might have been chapter 55 which deals with the carnal delights of the Mohammedan Paradise, or several other similar chapters in the Koran. Dr. POST disagrees with the idea that his father obtained his ideas on Islam from outside sources; on the contrary his analytical mind impelled him

Sorrow and suffering appealed to Dr. POST irresistibly. One of the causes of his gradual exhaustion during the last summer of his life was his sympathy and exertion in trying to provide relief for the multitudes perishing from the unutterable horrors of the Adana massacres (1909). He was a member of the local committee of the Red Cross Society, and the physicians, nurses, medical stores and provisions from this committee were the first to arrive at the scene of distress. He had also been greatly concerned at the partial collapse of the new Reform Movement in the Turkish Empire; the general misinterpretation of the meaning of true, civil and religious liberty, and at this last terrific outburst of old Turkish fanaticism and cruelty.

" He keenly felt also the rebellion of Mohammedan students in the college who refused to attend any longer the religious exercises and Bible classes, and although this was subsequently overcome by the firmness of the authorities of the college, the appearance of such a revolt weighed heavily upon Dr. POST's waning power (20)."

A severe cold finally terminating in pneumonia, brought about the death of Dr. POST. It was in his summer home at Aleih on Mt. Lebanon, almost at midnight, September 29th, 1909, that the end came.

A simple service at the house was conducted by his loving and venerable friends, Drs. HENRY and SAMUEL JESSUP, and Dr. DANIEL BLISS. The people came in great numbers to pay their last tribute of reverence and affection, and claimed the

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to seek first-hand information which his long sojourn in the East amply supplied. Says Dr. POST ' There was much in Islam which my father admired. He respected the temperance of the Mohammedan population as contrasted with the drinking habits of the so-called Christian communities, and frequently praised the men for their courage in battle, their resignation in calamity, and their fortitude in physical suffering. He admired the devoutness and simplicity of Muslim worship as contrasted with the tawdry display and image worship of many of the Christian sects. But his intimate knowledge of Mohammedan social life, a knowledge which was the product of 46 years of constant medical and surgical work in the homes of the people, made him keenly aware of the woes which seclusion of women, easy divorce and polygamy brought in their train, and against these he was outspoken. Thereby he no doubt at times antagonized loyal Muslims and some may have felt hurt that he was not disposed to praise either MOHAMMED or the Koran.' "

(20) DODGE, Rev. D. STUART, *The Presbytery*, and Dr. POST, *The New York Observer*, New York, Dec. 30, 1909.

privilege of bearing the casket through the limits of their own village.

A more public service was held at the American Mission Church in Beirut. The president of the college, Dr. HOWARD S. BLISS, presided, and Rev. Dr. SAMUEL JESSUP, Rev. Dr. HOSKINS and Rev. O. J. HARDIN took part, addresses being made both in English and Arabic. The burial was in the old cemetery of the Mission, where so many of the fathers, and their faithful successors, now lie.

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DEGREES AND DECORATIONS

In recognition of his valuable work, Dr. POST received in 1901 the degree of LL. D. from the New York University, and the same honorary degree from the University of Aberdeen in 1896. The German Governments bestowed the decorations of the Red Eagle and Knights of Jerusalem, the Turkish Government gave the " Order of Othmaniyeh " and another came from the Ducal House of Saxony. He was also a member of the following societies : Numismatic and Antiquarian Society of Philadelphia, Academy of Medicine of New York, New York Academy of Sciences, The Torrey Botanical Club of New York, The Linnean Society of London, The Palestine Exploration Fund of London, The American Palestine Exploration Society, The College of Pharmacy of New York, The Botanical Society of Edinburgh.

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WIFE AND CHILDREN

In 1863 (i.e., at the age of 25) GEORGE EDWARD POST was married to SARAH READ, daughter of FRANCES and ROBERT READ of Georgetown, N.C. Mrs. POST survived her husband, sharing, as far as her strength would allow, in the varied experiences of his long life. They had six children, namely :

1. ARTHUR M., born Dec. 10, 1864, died May 17, 1865.

2. ROBERT R., born Mar. 14, 1866, died Aug. 19, 1869.

3. ALFREDA, born Oct. 20, 1869—now residing in Washington, D.C. Graduated with honors from Packer Collegiate Institute in Brooklyn, N.Y. Conducted Sunday School and Visitation work in Beirut for many years. Married Rev. CHARLES L. CARHART, assisted him in pastorates in Dorset, Vt., and later in Hankow, China and also in Larchmont, N.Y. Still active in Sunday School work in Washington and has been very successful in staging Sunday School and missionary plays and pageants. Author of " Masoud the Bedouin " and other Syrian stories.

4. BERTRAM VAN DYCK, born Oct. 26, 1871 (given his middle name as a compliment to Dr. CORNELIUS VAN DYCK). He is a physician to Robert College, Istanbul. Graduated with honor from Princeton University in 1893 and was appointed valedictorian of his class but was unable to deliver the address on account of illness. Married CAROLINE HYDE HARDIN, daughter of a missionary in the Lebanon. Was professor of botany and zoology in Robert College for many years, made important collections for the museum of Robert College and is at present writing a flora of the Bosphorus. He took his medical course in the American University of Beirut.

5. FRANCIS R., born July 5, 1873, died Sept. 12, 1873.

6. WILFRED M., born Oct. 25, 1876, now residing in Williston Park, N. Y., practicing surgery and obstetrics. Fellow of the American College of Surgeons and Medical adviser to the Near East Foundation. Attending surgeon to the Nassau Hospital, Mineola, N.Y. and Consulting Surgeon to the Meadowbrook Hospital in Hempstead, N.Y. Graduated with honor from Princeton University and then studied medicine in Beirut and finished in College of Physicians and Surgeons in New York. Studied in Paris, married ANNIE STABB of New York, then spent 20 years in Asia and Istanbul in medical missionary work, being connected with the American Hospitals in Cesarea and Konia and later director of the American Hospital in Istanbul. Was invited to succeed his father in the chair of surgery of A. U. B. but declined on account of the critical condition of our mission in Asia Minor, when no men could very well be spared from the

work. Left Istanbul on account of the health of his wife who died in America and he then married again. Received a decoration from the Greek Government for work among refugees after the destruction of Smyrna.

(Detroit, Michigan.) LUTFI M. SA'DI.

BIBLIOGRAPHY OF THE MAIN WRITINGS OF GEORGE EDWARD POST

This bibliography is based on the examination of the books themselves in the British Museum and the Harvard Library. One item is quoted from the Arabic bibliography compiled and published by JOSEPH ELIĀN SARKĪS (Cairo, 1928-30, col. 602-3).

POST's writings may be divided as follows:

I. Medicine, II. Natural history, III. Bible.

I. *Medicine*

Before speaking of his own writings, we may mention two medical journals edited by him.

1. *Akhbār ṭibbiyyah* (See fig. 1; these words in the original copy measure 47 mm.). "Medical News." Monthly medical magazine edited by GEORGE POST. Only four numbers, each of 16 p., have appeared, all of them in Beirūt 1874. This is the title page of the first kurrās or part.

2. *Al-ṭabīb* (See fig. 2; these words in the original copy measure 58 mm.). "The physician." Medical journal being a continuation of *Akhbār ṭibbiyyah*. In fact the very first number, the title page of which is here reproduced, is called number 5 ('adad 5). It was published for three years 1874-76 and then stopped; in 1881, it was resumed for a year; in 1882, it was resumed for two thirds of the year. In 1881-82, there were two editors, GEORGE POST and WILLIAM VAN DYCK, and a manager, SHĀHĪN MAKARIOS. The British Museum has numbers 1-4, 5-56 (1874-82). In 1884-85, a new series was edited by the shaykh IBRĀHĪM AL-YĀZIJĪ and the doctors BISHĀRAH ZALZAL and KHALĪL SA'ĀDAH, 24 nos. being published. All of these numbers appeared in Beirūt.

Information given by H. H. JESSUP to KEGAN PAUL in London and corrected by the British Museum.

3. *Al-miṣbāḥ al-waḍḍāḥ fī ṣinā'at al-jarrāḥ* (See fig. 3; the first line

in the original measures 64 mm.). "The clear lamp dealing with the art of the surgeon." xii-702 p. Beirût 1873.

4. *Al-aqrabādhīn aw al-mawādd al-ṭibbiyyah.* This book was published in Beirût in 1874-76 (and later still?) as a feuilleton attached to the medical monthly *Al-ṭabīb.* The copy consulted by me at the British Museum lacks the title page (perhaps there was no title page?). I reproduce (fig. 4) the first page of the introduction. The words "al-fātiḥah" at the beginning measure 12 mm. in the original.

5. *Mabādi' al-tashrīḥ wal-hijiyīn wal-fisiulujiā.* With 100 figs. Beirût (no date). Elements of anatomy, hygiene and physiology.

I have not seen this book, which I quote after SARKĪS (no. 3 of his list).

II. *Natural History*

6. *Kitāb niẓām al-ḥalaqāt fī silsilat dhawāt al-faqarāt.* (See fig. 5, the second line of the title measures 73 mm.). A treatise on vertebrate animals. Beirût 1869, etc.

Part 1, dealing with mammals appeared in 1869, part II dealing with birds in 1882 (SARKĪS). I only saw part 1, 144 p., 1869, which is, as far as I know, POST's earliest book.

7. *Mabādi' 'ilm al-nabāt.* (See fig. 6; the second line measures 44 mm.). Elements of botany, including an explanation of the structure and functions of plants, and a description of their genera. 304 p. Beirût 1871.

8. *Nabāt Sūrīyat wa Falasṭīn wal-quṭr al-miṣrī...* Beirût, 1884, etc. Title page of the first part. (See fig. 7, the first word, nabāt, measures 19 mm. in the original.)

9. The botanical geography of Syria and Palestine. *Journal of the transactions of the Victoria Institute,* vol. 22, 253-98, 1 colored map, London 1889.

Paper read before the Victoria Institute on June 18, 1888. For the discussion which followed its reading see *ibidem,* p. 299-307. That discussion is of interest not only from the botanical point of view but also for the light it throws upon POST's personality.

This paper is quoted because it shows that by 1888 POST's general ideas on the Syrian flora had already crystallized.

10. *Plantae Postianae.* Published in ten parts, parts I to IV in Lausanne 1890-92, parts V to X in the *Bulletin de l'herbier Boissier,* Geneva 1893-1900.

11. *Flora of Syria, Palestine and Sinai from the Taurus to Ras Muhammad and from the Mediterranean Sea to the Syrian Desert.* (919 p., 414 ill., 1 map). Published by the Syrian Protestant College (later called American

University), Beirūt 1883 to 188(?), reprinted or republished with a new cover in 1896.

This work to which Dr. POST devoted the best years of his life, is his most important scientific contribution. His other works (excepting the *Fihrist*) were adaptations to Arabic use of elementary scientific treatises; however great their importance from the point of view of the diffusion of knowledge, their scientific importance is negligible.

POST's scientific fame is exclusively but very securely founded on this *Flora*, which was the first to cover that part of the world with sufficient elaboration and accuracy. It has remained the standard work until now. The title should be explained as follows: it is a flora of the natural region called Syria, limited in the north by the Taurus mountains and in the East by the Desert, of the Sinai peninsula which continues it down to its southern end (Ras Muhammad) and of Egypt down to the corresponding latitude (c. 28°N).

Some additions and corrections to POST were indicated by A. EIG, M. ZOHARY, and N. FEINBRUN: The plants of Palestine. An analytical key (428 p., Hebrew University, Jerusalem 1931; in Hebrew). These improvements as well as many others have been incorporated in the new edition of POST's *Flora* prepared with infinite care by JOHN EDWARD DINSMORE.

11bis. *Flora of Syria, Palestine and Sinai. A handbook of the flowering plants and ferns, native and naturalized, from the Taurus to Ras Muhammad and from the Mediterranean Sea to the Syrian Desert.* Second edition, extensively revised and enlarged by JOHN EDWARD DINSMORE (2 vols., xliv-639 p., xviii-928 p., 774 fig., 5 maps). American University of Beirūt 1932-33. (See fig. 8; the third line of the title measures 96 mm. in the original.)

This second edition is almost double in size, and takes into account almost everything that has been written on the subject since the publication of the first. The new sources are duly enumerated. There is an elaborate Arabic index (p. 833-43), a brief Hebrew one (1 p.), and a general index covering 84 p. The illustrations are abundant, about one half of them having been drawn from specimens in the Post Herbarium by Mrs. OLGA HOLENKOFF of Beirūt. I can witness to the loving care with which this new edition was prepared because during my stay in Syria I often lunched with Mr. DINSMORE and we talked mostly of his work and of the plants of the Holy Land. Mr. DINSMORE is living at the American Colony in Jerusalem, but he was then spending much of his time at the American University, Beirūt, where his fundamental source, the Post Herbarium, is preserved.

The POST-DINSMORE *Flora* of 1933 is a credit, not only to the authors,

but to the American University of Beirūt, even as the POST *Flora* of 1896 was a credit to the Syrian Protestant College. It is thrilling to realize that works of such high quality and scope and permanence were brought into being by the great American School of Syria.

III. *Bible*

12. ***Fihris al-kitāb al-muqaddas*** (see fig. 9; these words measure 84 mm. in the original). Beirût 1873-77.

This is a Concordance to the Holy Bible compiled under POST's direction upon the Arabic translation by CORNELIUS VAN DYCK, about which see *Isis* 27,42.

The first part (alif to ṣād) appeared in 1873-5 (preface by POST dated 1875); the second and final part was completed in 1877. A new edition was published by the same press (American Press) in 1930 (vi-688 p.).

According to POST's Arabic preface and Dr. SA'DI's account, the work was compiled with meticulous care; my frequent use of it enables me to testify to its accuracy.

13. ***Qāmūs al-kitāb al-muqaddas*** (see fig. 10, the second line of the title measures 6 cm. in the original). "Dictionary of the Holy Bible" translated and edited by POST. 2 vols. Beirūt, American Press, 1894-1901.

Vol. 1, 655 p., 1894; vol. 2, 559 p., 1901, with atlas of 12 maps.

The European sources of this work are not clearly indicated but it is in all probability a free abridgment of the *Dictionary of the Bible* edited by JAMES HASTINGS (1852-1922), 5 vols. Edinburgh, 1898-1904. Indeed POST contributed many articles on natural history and archaeology to that Dictionary, and would naturally take it as his model.

The reader will please bear in mind that this is not a complete list of Dr. POST's writings which would be very long, as he was a voluminous writer and contributed frequently to various serials. However, it includes his main publications, and in all probability the totality of his Arabic books in which we are particularly interested because of their influence upon the scientific education of the Arabic world.

To conclude I wish to thank the Trustees of the British Museum for every illustration used in this list except fig. 8 which I owe to the courtesy of Harvard University.

(Cambridge, Mass.
Jan. 30, 1937.) GEORGE SARTON.

اخبار طبية

كراس

مؤلفة الدكتور جورج بوست

بيروت سنة ١٨٧٤

FIG. 1.—First copy of the *Medical News* edited by GEORGE POST. Beirūt 1874.

الطبيب

عدد ٥

جرنال طبي وعلمي يُنشر في اول كل شهر

مؤلفة الدكتور جورج بوست

استاذ الجراحة والتوليد والطبية والنبات في المدرسة الكلية في بيروت

قيمة الاشتراك لاجرة فرنسارية سنوياً تدفع سلفاً مع اجرة البريد الى المواضع خارج بيروت

قيمة الاعلانات السطر غرشان

بيروت في ١ آذار سنة ١٨٧٤

FIG. 2.—First copy of *The Physician*. Edited by GEORGE POST. Beirūt 1874.

المصباح الوضاح

في

صناعة الجراح

تاليف وترجمة الدكتور جورج بوست
استاذ الجراحة في المدرسة الكلية في بيروت
عفى عنه

اتمّ طبعه في شهر نوفمبر سنة ١٨٧٣

FIG. 3.—POST'S treatrise on surgery. Beirût 1873.

الفاتحة

لما كانت الادوية المذكورة في الكتب الطبية المترجمة حديثا الى اللغة العربية من اللغات الانكليزية والفرنساوية والالمانية مركبة حسب اقرباذينات انكلترا والولايات المتحدة وفرنسا والمانيا ولما قد استوطن سورية والديار المصرية وسائر البلاد العربية عدد غفير من اطباء تلك الامم وصيادلتهم كان لا بدّ من تاليف كتاب الاقرباذين يجمع ما يهم الطبيب من خصوصيات تلك الاقرباذينات ويتضمّن اختلافاتها وتنوعاتها ولاسيما في امر قوة المستحضرات وكمية جرعاتها لكي يمكن الطبيب الوطني ان يتشاور مع الاطباء الاجنبيين . فان بعض المركبات الدوائية الفعالة تختلف اختلافاً كثيراً في الاقرباذينات المذكورة بحيث اذا تفاعل الطبيب عن ذلك ووصف دواءه باعتبار اسمه فقط يمكنه ان يؤذي العليل او يميته . مثال ذلك صبغة الاكونيت فان نسبة الجذر والاوراق الى السيرتو حسب الاقرباذين الانكليزي ١ الى ٨ والجرعة من ٥ منمات الى ١٠. وحسب الامبركاني ١ الى ٢½ والجرعة منم فصاعداً. وحسب الفرنساوي (الكولاتور الاكونيت) ١ من الاوراق الطرية الى ١ من السيرتو والجرعة ٥ منمات فصاعداً وحسب الالماني ١ من الجذر الى ١٠ من السيرتو والجرعة مثل جرعة الصبغة الانكليزية تقريباً. وكذلك شراب يود يد الحديد فان في كل درهم من الانكليزي ٤½ قمحات من اليوديد. ومن الامبركاني ٧½. ومن الفرنساوي ½ قمحة . ومن الالماني ٣ قمحات . وتختلف الجرعات بالنسبة الى ذلك

وتختلف تسمية المركبات في الاقرباذينات المختلفة فان صبغة الكافور المركبة Tinctura Camphoræ composita الانكليزية تسمّى في الاقرباذين الفرنساوي صبغة خلاصة الافيون المكوفرة Tinctura cum Extracto Opii camphorata وقويها ضعفا قوة الصبغة الانكليزية وتسمى في الامبركاني صبغة الافيون المكوفرة Tinctura Opii camphorata وهي اقوى من الانكليزية قليلاً. وتسمى في الالماني صبغة الافيون المبزنة Tinctura Opii benzoica وهي ايضاً اقوى قليلاً من الانكليزية

FIG. 4.—First page of POST'S *Materia medica*. Beirût 1874.

surgery. Beirût 1873.

FIG. 4.—First page of POST's *Materia medica*. Beirût 1874.

كتاب

نظام الحلقات مع سلسلة دوات الفقرات

الجزء الاول

الحيوانات ذوات الاثدي

تاليف الفس حورج بوست الاميركاني الطبيب

طبع في بيروت سنة ١٨٦٩ مسيحية

FIG. 5. — POST's Treatise on vertebrate animals. Part 1. Beirût 1869. His earliest Arabic book.

مبادىء

علم النبات

تتضمن

شرح بنيتهِ ووظائفهِ

ووصف

الفصائل الطبيعية

تاليف جورج بوست

عفي عنهُ

طبع في بيروت سنة ١٨٧١

FIG. 6.—POST's Elements of botany. Beirût 1871.

نبات
سورية وفلسطين والقطر
المصرى وبواديها

الجلد الاول

وهو يتضمن تسعًا واربعين رتبة

من الشقيقية الى الكورنية

تاليف الدكتور جورج بوست

عضو في الكلوب السانى النيويارك في نيويورك والجمعية السانية في ادنبرج واستاذ السانة في المدرسة الكبة الانجيلية في بيروت سابقًا

طبع في بيروت سنة ١٨٨٤

FIG. 7.—POST'S Flora of Syria and Palestine. Beirût 1884.

FLORA
OF
SYRIA, PALESTINE AND SINAI

A HANDBOOK OF THE
FLOWERING PLANTS AND FERNS, NATIVE AND NATURALIZED
FROM THE TAURUS TO RAS MUHAMMAD AND
FROM THE MEDITERRANEAN SEA TO THE SYRIAN DESERT

BY

GEORGE E. POST, M.D., D.D.S., LL.D.
LATE PROFESSOR OF NATURAL SCIENCES
OF THE AMERICAN UNIVERSITY OF BEIRUT

SECOND EDITION, EXTENSIVELY REVISED AND ENLARGED
BY
JOHN EDWARD DINSMORE, M.A.
OF THE AMERICAN COLONY, IN JERUSALEM

ILLUSTRATED WITH MANY DRAWINGS

VOLUME I

AMERICAN PRESS, BEIRUT, 1932

FIG. 8.—POST AND DINSMORE'S Flora. Beirût 1932-33.

FIG. 7.—POST's Flora of Syria and Palestine. Beirût 1884.

FIG. 8.—POST and DINSMORE's Flora. Beirût 1932-33.

فهرس الكتاب المقدس

وهو قاموس يُستدَلُّ به من الفاظ الكتاب المقدس الرتبة على مواضع آياته

جامعهُ جورج بوست

عُني بهِ

شرع في طبعهِ سنة ١٨٧٣

FIG. 9. — POST's Arabic Concordance to the Holy Bible. Beirût 1873-77.

قاموس

الكتاب المقدس

ترجمة وتأليف الدكتور جورج بوست عُني بهِ

مجلد اوّل

من ا الى ش

ARABIC BIBLE DICTIONARY.

Translated and Edited by Rev. GEO. E. POST, M.D.

VOL. I.

Alif to Shin.

بالرخصة الرسمية من نظارة المعارف العمومية الجليلة نمره ٢١٧ في ٢٢ شباط سنة ١٣٠٩

طبع في بيروت في المطبعة الاميركانية سنة ١٨٩٤

FIG. 10.—POST's Bible Dictionary. Beirût 1894-1901.

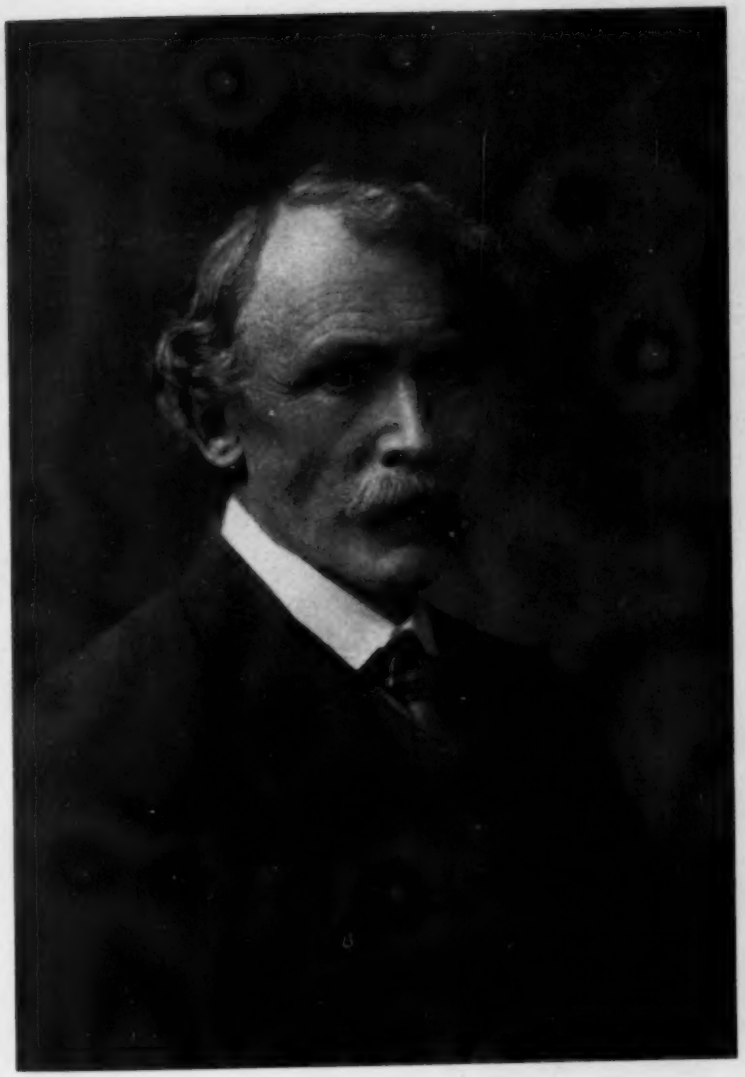
Arthur Berry, Historian of Astronomy (1862-1929)

ARTHUR BERRY is well known to historians of science through his "Short history of astronomy" (first published by MURRAY, London 1898). This was an elementary book but remarkably good, in fact one of the best books of its kind and size. It was reprinted in England and also in America at least twice (1899, 1910), and it was translated into Italian by D. GAMBIOLI and E. MILOSEVICH (Roma 1907). However, BERRY was primarily a mathematician. There is an incomplete list of his papers in POGGENDORFF's *Handwörterbuch* (vol. 5, 100, 1925).

To return for a moment to his "Short history," the young readers of to-day should remember that it was first published in 1898, a date which may seem to them very remote. Indeed the progress of astronomy within our century (especially stellar astronomy, astrophysics, astrochemistry and related subjects) has been so enormous, that not only many new chapters should be added but some of the old chapters should be revised. Our perspective of ancient astronomy is somewhat different to-day from what it was in 1898. This illustrates the fact upon which I have repeatedly insisted that the past is not static and final but on the contrary changing according to the new light which we are able to throw upon it. On the other hand our knowledge of ancient and oriental astronomy has been deepened considerably within this century.

The following obituary was originally published in the Annual report of King's College, Cambridge, dated Nov. 16, 1929. As such an administrative report is bound to remain unknown to the world (outside King's College) I obtained from the Provost the permission to reprint it in *Isis*. I beg to thank Dr. JOHN TRESIDDER SHEPPARD for this courtesy, as well as the late Professor FRANK MORLEY (1860-1937) of Johns Hopkins University, Baltimore, for the communication of BERRY's portrait.

Sept. 25, 1937. GEORGE SARTON.



ARTHUR BERRY

UNIV. OF MICH.

ARTHUR BERRY, Vice-Provost of King's College, died on August 15, 1929. Born on December 28, 1862, he was at University College School, and then at University College, and took the B. A. Degree of the University of London in 1881. He entered the College as a Scholar in 1882, and was Senior Wrangler in 1885. He was placed in the 1st Division in Part III of the Mathematical Tripos in January 1886, and a year later was awarded a Smith's prize. In 1886 he was elected a Fellow. In 1887 he studied at Göttingen under FELIX KLEIN, for whom he always retained a warm regard. But he had already been drawn into work as an Extension Lecturer, and for some time this engaged a large part of his attention. He was Secretary of the Cambridge University Extension Lectures for the period 1891-5. And about this time he began to write, in the form of a University Extension Manual, his *History of Astronomy*, which was published in 1898. Though this book is planned on a modest scale, he put a great deal of work into it, studying in many cases original authorities instead of accepting what was commonly reported about them. In 1889 he began his career as a Mathematical Lecturer in the College, which he carried on till the end of his life. In 1892 he became an Assistant Tutor. From 1889 onwards, with the exception of three years during the war, he was regularly elected a member of the Council, and an Elector to Fellowships; and served on many committees. In 1924 he was elected Vice-Provost, and the energy and tact which he has shewn in the performance of the duties of this office, under unusually difficult conditions, are still fresh in our minds. In 1924-6 he was one of the Commissioners appointed to act for the College in making new Statutes. He was personally most concerned with the questions relating to the tenure of Fellowships and College Offices, and if the problems involved have been satisfactorily solved, this is largely due to his care.

Many women students of Mathematics at Girton, and some at Newnham, were his pupils. His long and intimate connection with Girton College began in 1886, when he took some pupils there in the Lent and Easter Terms. He did this again for several years from 1889, and almost continuously from 1893 till 1914 he held the title of Staff Lecturer, and had official responsibility. In 1900 he became a member of the College. And

from 1900 till his death he was a member of the Executive Committee, now called the Council, and in other ways took an active part in the government of the College. He gave a great deal of time and thought to the preparation of the Royal Charter, which was granted in 1924. And the smooth and efficient working of the new constitution of the College, framed in connection with this, is largely attributed to his practical help and clear insight.

As a mathematician he was distinguished for learning and accuracy. His published work is contained in a number of papers in various scientific journals. Some of them are in the form of short notes. The more important ones deal with the theories of elliptic functions and differential equations, mines into which he was always ready to dig when he had time. But time was often curtailed by his generous readiness to help other people, offering help sometimes in such a way that it hardly could be declined. During the war, after he had served for some time in the intelligence department of the army, he was employed by the navy to help in dealing with some of the mathematical problems connected with aeronautics, and he was pleased to find himself capable of doing this unaccustomed work. Several of his papers on this subject have been published.

WILLIAM MORTON WHEELER

William Morton Wheeler

The death of WILLIAM MORTON WHEELER, on April, 19, 1937, has brought to a close the life of one of the world's foremost scientists and scholars, and an important contributor to the history and philosophy of science.

Professor WHEELER was born on March 19, 1865, in Milwaukee, Wisconsin. He attended Engelmann's German Academy and later graduated from the German-American Normal School in Milwaukee. During the year following his graduation he was employed in Ward's Natural Science Establishment at Rochester, identifying and cataloguing collections of animals. The next year, at the age of twenty, he returned to Milwaukee to teach German and physiology in the public high school, but two years later (1887) was appointed the custodian of the Milwaukee Public Museum. His interest becoming aroused in insect embryology, he went to Clark University in 1890 to study under C. O. WHITMAN, and two years later obtained his doctorate of philosophy, without having previously received a baccalaureate or its equivalent. His *Contribution to Insect Embryology*, which was based upon his studies at Clark, is now regarded as a classic in entomological literature. After a year of study at Würzburg, Liége, and the Naples Zoological Station, he was appointed to the faculty of the University of Chicago to teach embryology. In 1899 he transferred to the University of Texas. Finding the library facilities there inadequate to enable him to continue his investigations on insect embryology, he changed his research activities to the study of the behavior and taxonomy of the ants. In 1890 he went to the American Museum of Natural History in New York as curator of invertebrate zoology and remained there until 1908, when he accepted the appointment of professor of entomology at Harvard University, a position which he held until his retirement in 1933.

Although WHEELER did not have a formal college training, his

great intellectual qualities were apparent even before he was twenty. In a brief account of his early life (*Natural History*, vol. 27, no. 2, 1927, pp. 133-141) he states that when he was at the Milwaukee Museum, at the age of twenty-two, he patiently read a whole small library, consisting of such works as BRYCE's *American Commonwealth*, translations of AESCHYLUS, NORDAU, etc., since at that time he had serious objections to beginning a book without reading its every word. This early habit of reading classical literature thoroughly persisted for the duration of his life, and was undoubtedly responsible in large measure for his ability to write such excellent prose as is contained in his account of the life and work of RÉAUMUR and the essays comprising the *Foibles of Insects and Men*. Although he was primarily an entomologist, his studies on social insects led him to psychology and sociology and he was universally regarded as an authority on the comparative aspects of those sciences. In the ancient sense of the word, he was a philosopher. Professor A. N. WHITEHEAD, himself one of the foremost philosophers of science, has recently stated that WHEELER was the only man he had ever known who would have been worthy and able to sustain a conversation with ARISTOTLE.

Professor WHEELER was a member of many societies and academies, both scientific and philosophical. He was the recipient of the Elliot Medal of the National Academy, the Leidy Medal of the Philadelphia Academy, and was an officer in the Legion of Honor. He also held four honorary degrees, conferred by the University of Chicago, the University of California, Harvard University, and Columbia University.

His bibliography contains 467 titles. Most of these publications are concerned with the classification, structure, and behavior of ants, but a large number of them deal with problems of embryology, evolution, parasitism, and the social life of animals in general. The best known of his books is undoubtedly *Ants : Their Structure, Development and Behavior* (1910), but several of his other books, such as *Social Life Among the Insects* (1923; see *Isis* 6, 578-80), *The Social Insects* (1928), *Demons of the Dust* (1930), and *Foibles of Insects and Men* (1928), have also been very widely read.

Professor WHEELER had a sincere interest in the history of science. In the preparation of all of his general works he carefully and tho-

roughly investigated the history of the subject, referring whenever possible to the original publications. More than one third of the *Demons of the Dust*, which is a study of the behavior of certain desert insects, is devoted to a discussion of the observations of various 18th and 19th century naturalists. Two of WHEELER's publications were specifically concerned with unpublished or incompletely published manuscripts of LAMARCK and RÉAUMUR. One of these, *The Lamarck Manuscripts at Harvard* (1933; see *Isis* 23, 261) with Professor THOMAS BARBOUR as joint author, contains copies of the originals and translations of six holographic manuscripts in the library of the Museum of Comparative Zoology. The other work, *The Natural History of Ants* (1926; see *Isis* 9, 445-1), the most important of WHEELER's publications on the history of science, consists of a copy of the original and a translation of an unpublished manuscript of RÉAUMUR. The manuscript, contained in the archives of the French Academy of Sciences, was studied by WHEELER while he was acting as exchange professor to the University of Paris in 1925. The forty pages of notes accompanying this translation are illustrative of the thoroughness and scholarly treatment which characterize all of WHEELER's writings. Only a day or so before his sudden death he had been reading TORLAIS' *Réaumur*, with the intention of publishing a review in *Isis*. It is appropriate that this life of RÉAUMUR should have been one of the last books he was to read, because TORLAIS' brief characterization of RÉAUMUR on the cover of the book might equally well be applied to Professor WHEELER — *Un esprit encyclopédique en dehors de l'encyclopédie.* **

Cambridge, Mass. July 10, 1937. FRANK M. CARPENTER

** More information about Prof. WHEELER may be found in the obituary written by L. J. HENDERSON, THOMAS BARBOUR, F. M. CARPENTER and HANS ZINSSER (*Science*, vol. 85, 533-5, 1937). We are indebted to the New England Museum of Natural History for the use of the portrait accompanying this article.

A defence of Egyptian alchemy

The historians of science, especially those interested in alchemy, have welcomed the valuable contributions of Wu and Davis (1) which give the first translation of the alchemistic writings in China, making these little-known activities available in English. They have established the fact that Chinese alchemy was undoubtedly the earliest form of this pseudo-science (2).

This thesis is now being given further expression by Professor Tenney L. Davis in a series of articles (3). In a desire to find a probable successor to Chinese alchemy, he has recently suggested the possibility of Chinese influence in Persia, from which the Islamic alchemists sprang. If he could succeed in this, he might hope to establish a direct filiation between these workers in China and European alchemy, even up to the time of Boyle and Lavoisier. This ambitious purpose is somewhat frustrated by the accepted evidence of an extensive form of alchemy in Egypt.

When I published my book on Egyptian alchemy a little over two years ago (4), I did not claim that the Egyptian was the earliest possible form of alchemy. I tried to present to the historian a new picture, as I saw it, of the way in which alchemy in Alexandria, with its distinct characteristics, grew naturally from the accomplishments of certain preceding artizans, working on the coloring of metals; and also that the theories of these alchemists were identical with those taught in the Greek academy founded by Alexander. On the first pages of my book I naturally described

(1) Wu and Davis : *Scientific Monthly*, XXXI (1930), 225; *The Technology Review*, XXXIII (1931), 1; *Isis*, XVIII (1932), 210; *Proceedings of the American Academy*, LXX (1935), 221.

(2) Berthelot in his *Origines de l'Alchémie*, pp. 52-53, has a rather obscure notice of this Chinese alchemy from d'Hervey of Saint-Denis.

(3) Tenney L. Davis : *J. of Chemical Education*, XI (1934), 517; and XII (1935) 2; *Isis*, XXV (1936), 327; *Scientific Monthly*, XLIII (1936), 551.

(4) Hopkins : *Alchemy, Child of Greek Philosophy* (1934).

the work of the artizans and their crude efforts at explanation, after which, I turned immediately to the philosopher ZOSIMUS, and his success, first, in applying the ideas of PLATO and ARISTOTLE as explanations of these practical results; and, second, in his establishing an elaborate technique for the preparation of silver and gold from the base metals. With this theory and technique of ZOSIMUS arose the indubitable alchemy of Alexandria, including belief in the success of the alchemists' transmutations and ZOSIMUS' detailed and rather intelligible description of method, such a description as is found nowhere else (5).

In a recent article (6) DAVIS states that he accepts as proved what I have found on the activities of the early artizans; but he claims that this was not alchemy (which I had already stated) (7) and he goes yet further thus :

"Since there was no alchemy in Egypt, there could have been no theory of alchemy."

In other words, DAVIS ignores all of the work of ZOSIMUS and the real alchemy of Egypt.

Now to schedule these events, we have

1st. *The Egyptian artizan* and his unexplained results in the coloring of metals. This DAVIS accepts.

2nd. *Zosimus*, the philosopher, whose explanation DAVIS will probably agree was greatly influenced by Greek philosophy.

3rd. *Alchemy*, founded by ZOSIMUS, which DAVIS refuses to recognize.

It therefore remains to be shown that ZOSIMUS' work was followed by Egyptian alchemy.

But DAVIS takes as his premise that there was nothing in all the Egyptian period but an industry. If that were so, his deductions would be correct. He even ascribes the same idea

(5) I also indicated that much of the alchemy of Islam can be traced to the writings of ZOSIMUS. This will be developed more fully in an article now in preparation.

(6) DAVIS : *The Problem of the Origin of Alchemy*, *Scientific Monthly*, XLIII (1936), 551.

(7) HOPKINS *(op. cit.)*, p. 70 : "All this is very interesting. It seems that we have here the early industry which was not alchemy but close to it and was fundamental to that form of applied philosophy which was later called alchemy. A very different outlook appears in our next author, ZOSIMUS."

to HOPKINS when he says, " If HOPKINS' view is correct, then the Alexandrians were not practicing alchemy." My idea of Egyptian alchemy was by no means built up on an art or industry but upon an important theory, that of ZOSIMUS. Is it necessary for me to discuss DAVIS' arguments based on this strange and unproved premise? As the premise so are the deductions.

Before I enter upon an *apologia* for the alchemy of Alexandria, I shall offer these comments :

1st. The first authentic writers on Islamic alchemy JABIR and AL-RASI, did not receive their alchemy from a distant country, called Persia, or from an early era such as that of the Egyptians. Both of these writers were born or spent most of their lives in Persia, so that Islamic alchemy came to us from Persia and from the Arabs living there. This clarifies DAVIS' quotation of the observation of Professor WINDERLICH.

2nd. The *Elixir of Life* was peculiar to China. The grand objective of the Islamic writers was the Elixir, i.e. the agent with unlimited power of transmutation.

3rd. The Yin-Yang theory is not very persuasive as an argument or test to guide us to Islamic alchemy. The Egyptians used mercury and sulphur, also.

Perhaps it is not improper to ask what proof DAVIS has to present for such statements as

> " They (the Egyptian writers) were aware that their products were not genuine "; " They did not practice the conversion of base into noble metals "; and " They were attempting to make gold for its commercial value."

To accept the conclusions as presented by DAVIS would be to undermine the whole structure built up by those Egyptian alchemists who called themselves " The new expositors of PLATO and ARISTOTLE."

But DAVIS states very well :

> " The belief that the conversion of the base metals into noble metals can be accomplished artificially is belief in the truth of alchemy; and the effort to bring it about by chemical means is the practice of alchemy."

I would like to call attention to the omission of both the Yin-Yang theory and the elixir of life from this definition, very properly so for they are quite outside the accepted meaning of the term alchemy. The introduction of such exterior matter, as pre-

requisite to alchemy, which it was impossible to include in his definition, is what causes the confusion in DAVIS' argument.

Real Egyptian alchemy fits closely into the mold of DAVIS' definition. Here is a quotation from ZOSIMUS :

" Our gold, which possesses the desired quality, can make gold and tint (*βάπτειν*) into gold." (8)

ZOSIMUS is the supposed author of a theory designed to explain the results obtained by artizans in Egypt—results which must have seemed to them amazing. He provided an acceptable interpretation simply by applying certain Greek theories, from exact accord with which he never departs. It was he who gave the four steps peculiar to Egyptian alchemical practice (9), and it is his composite theory which constitutes Egyptian alchemy.

I shall review now the application of four of these theories —three of them direct from PLATO and ARISTOTLE; one, (the third in sequence) of possible Egyptian (or Chinese) origin.

(1) The first theory, enunciated by ARISTOTLE, was this : All animals and vegetables are alive and sensitive like man (to which the alchemists added the metals) and all are striving to become, in their species, as perfect as possible.

In order to test this theory it was necessary for the philosophers to distinguish the metals by definition. This the Egyptians had already done (in accord with their contemporaries and all primitive people) by the simple idea of color. Thus, gold was the reddish-yellow metal; silver the brilliant white metal, etc.

Each metal, being alive like man, was assigned a Body and a Spirit. The *body* was common to all metals. It was a portion of PLATO's universal matter, heavy, unchangeable; and, without the spirit, having no individuality, because endowed with no properties.

The *spirit* was volatile and indestructible, but each spirit carried

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(8) BERTHELOT, *Collection des anciens alchémistes grecs*, III-VI, 10. (This quotation, word for word, is found in AL-JILDAKI in the 14th Century.)

(9) BERTHELOT, *op. cit.*, III, XXIX, 2. " The philosophers have divided all the operations into four steps : blackening, whitening, yellowing and tinting in violet."

an individualizing property which became important only when it was provided with a body, i.e. a portion of matter (10).

We can see from this that the colors which distinguish one metal from another are the spirits of the metals, and it is these which are tending to become " as perfect as possible "—which, in the metals, means that they are all striving towards the reddish-yellow of gold, the highest of the metals.

The important " vapors," which sublime before the fire, are mercury and sulphur and these are generally referred to as the active " tinctorial spirits," (11) because they are able to cause color-changes. The relation of body and spirit in a metal is seen by this quotation :

> " Thus to convert (στροφή) and to transmute (ἐκστροφή) signifies to give a body to the spirit." [by which a metal results] (12).

This theory of the living metals, having body and spirit, alive and sensitive, is peculiarly Alexandrian. It occurs nowhere else in alchemy (13).

(2) The second important Greek theory was that matter, as matter, free from any individual spirit, is " an ideal substance upon which to impress any particular quality." Plato gives this very clearly by illustrations (14).

But the alchemist had no such perfect recipient on which to impress a single spirit or color. Nothing so already individual as copper would do. The sub-stances (note the etymology) must be free from all interfering qualities. We find these our alchemists, therefore, proceeding skillfully, in their first process, to prepare just such a matter ! (15) They fused together their four base metals into an alloy in which one could not say : This is copper

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(10) BERTHELOT, *op. cit.*, II, IV, 15 (OLYMPIODORUS). " Metals were at first volatile in the fire because they had found nothing which could fix them but when they were led to a complete fixity, the nature of the tincture made them change into the state of metals."

(11) BERTHELOT, *op. cit.*, III, XII, 5 (ZOSIMUS). " Such is the useful thing, the tinctorial element."

(12) BERTHELOT, *op. cit.*, III, XXVIII, 7 (ZOSIMUS).

(13) And any author quoting this theory reveals an acquaintance with Egyptian alchemy far beyond the simple art of color-changes.

(14) TIMAEUS, 50*e*.

(15) BERTHELOT, *op. cit.*, II, IV, 44.

or this is lead, since the mass was black, from oxidation, and "blackness is the absence of all color."

Now the coloring process must begin upon this ideal matter, and since colors are in grades of nobility, it was requisite that the first color impressed must be white, standing for silver—the color next below yellow, which was gold (16).

The Spirit of whiteness, impressed on this neutral *Body*, gives the proper metal-combination (i.e. spirit on body) and the metal resulting in this case is silver. The alloy, after fusing (because spirits, as forces, have their greatest energy in the liquid state) was subjected to two treatments at the same time:

1st. The *surface* was flooded with mercury which initiates the whitening process, giving a silvery appearance;

2nd. This tendency is reinforced by a small quantity of "ferment" called "silver" (the metal, or any silvery alloy provided by the kerotakis process).

Thus the whole process is accelerated to the silvery stage.

(3) The third theory of the Alexandrian chemists was one which may have been Egyptian but has always seemed to me of oriental origin, the "theory of reflection," nearest to the Yin-Yang of the Chinese, i.e. that each color conceals an opposite, occult color.

"Nothing is whitened first and yellowed later, but one whitens and yellows in one continuous process" and "At the same time you whiten on the outside, you yellow on the inside." (17)

The alloy had now become silvery white—due to the mercury; but on the inside of the fused mass it was yellow. It had passed the intended goal, and had already started on its upward tendancy towards gold—due to the catalyst.

All that was left to do was the development of this occult quality. Similarly to the preceding step, the mass was again fused and sulphur or "anything which can yellow" was added; and at the same time a small quantity of a ferment of gold (the metal, or some goldlike product from the kerotakis process) was added so that the sulphur started the surface-yellowing but the catalyst gathered to itself (like with like) all the yellow (surface in this

(16) BERTHELOT, *op. cit.*, II, III, 7. (SYNESIUS) "The yellow which signifies gold and the white which signifies silver."

(17) BERTHELOT, *op. cit.*, III, VI, 20, 21. (ZOSIMUS.)

step and occult in the previous step) so that finally the whole mass was yellow, inside and outside, i.e. gold.

Here we should remember clearly that this gold was spiritual gold, for " the material of the gold is nothing. The quality which is gold is independent of the substance which is its support " (18).

(4) The fourth theory was announced by ARISTOTLE, when in his famous " doctrine of forms " he explains that the highest attainment of all living things, in their species, is reached when the individual can reproduce itself—the entelechy. Similarly, the final step of the alchemist, after the production of gold, was the development of the highest of colors, the violet color or Ios. Here the argument seemed to the Egyptians conclusive : Just as the occult yellow of silver indicated a potential gold, so the violet, seen then for the first time, presaged the development of an unknown metal higher than gold, as gold was higher than silver; and which they thought, if they could obtain it in sufficient quantity to use, would be found capable of reproducing itself without limit.

" The mystery of the gold-tincture is to change metals into spirits in order to tint into spirituality"—" until the spiritual and perfect gold is accomplished." (19)

This Ios has been already sufficiently discussed (20), not only as representing the entelechy (in alchemistic form) but also as carrying the germ of the idea of the *Powder of projection* and the *Elixir*, of the later Islamic writers.

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Glancing back now to the definition of alchemy given above we may see that the Egyptians presented a most painstaking and elaborate process for producing gold artificially from the base metals; and not only believed that they had succeeded in this, but, far beyond their hopes, had obtained a super-gold in the Ios.

(18) BERTHELOT, *op. cit.*, p. 134, note 4.

(19) BERTHELOT, *op. cit.*, IV, I, 9 and 11 (ZOSIMUS).

(20) HOPKINS, *op. cit.*, pp. 97-102, 122-123; v. also BERTHELOT, *op. cit.*, III, XXIX, 3 (ZOSIMUS). " It is the tincture produced in the interior which is the true tincture in violet which has been called the Ios of gold... See then that it penetrates into the depths. If not, the tincture cannot take place."

If the Egyptian changed a black alloy, through patient steps directed by an exacting theory, into a metal, yellow through and through, " not potentially but actually," so that " the spiritual and perfect gold was accomplished "; and this by chemical means, involving a special catalyst and the use of Mary's kerotakis reflux condenser, if, I maintain, these things are true, can one deny that this product was " his gold," just as truly artificial gold as that of China or Persia or Latin Europe? If we quarrel with the Egyptian definition of gold, ask what was the Chinese definition —or in fact the Islamic or Latin definition. To all, it was the *yellow metal*.

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To one who has read that portion of my book which deals with the theory of ZOSIMUS, the resumé of the argument, as just presented, will seem unnecessary. To others, this short statement may be helpful in proving the existence of a form of alchemy in Egypt. My one present objective is the denial of much which DAVIS has written wherever he touches on Alexandrian alchemy.

DAVIS suggests but does not successfully prove the inheritance of alchemy from China. Even if proved, it would still be impossible to make this a *basis* to refer to " the indubitable alchemy which the Arabs possessed," and for him, alone in all the world, to deny the existence of that earlier alchemy upon which, and upon which only, the alchemy of Islam depended and was built up.

The doctrine of the two contraries is very ancient. It appears in sex, in morals and in nearly all religions. But it is difficult to prove that all these forms originated among the Taoists of China. One thing is certain that in ZOSIMUS' alchemical writings references to this doctrine are never direct and generally only parenthetical.

As I have already stated, my only objective at present is to describe in a few words the real alchemy of ZOSIMUS in Egypt, to which Islamic alchemy and Latin alchemy owed their beginning; and with references to which and with quotations from which their books are filled.

(Amherst College, Amherst, Massachusetts.)

ARTHUR JOHN HOPKINS.

Mediaeval Jewish Physicians in the Near East, from Arabic Sources (*)

Our knowledge of the life and works of physicians, and in particular of Jewish physicians in the Near East during the Middle Ages comes from two sources; firstly the study of those works of theirs which have come down to us, and secondly from Arabic bio-bibliographic works. I mention here only the best known of such works : The ***Fihrist*** (1) or "Catalogue" composed about 987 A.D. in Baghdad by IBN AN-NADĪM; the *Ṭabaqāt al-Umam* (2) or "Classes of Nations" of IBN ṢĀ'ID, a learned judge of Toledo (died 1070 A.D.); the *Ta'rīkh al-Ḥukamā* (3) or "History of Learned Man" of IBN AL-QIFṬĪ, an Egyptian historian who spent many years in Jerusalem and was then appointed vizier in Aleppo where he died in 1248 and who was a friend to MAIMONIDES' disciple IBN 'AKNĪN; and last not least the great "Choicest News on the Classes of Physicians" (4) composed by IBN ABĪ UṢAIBI'A, the descendant of a prominent medical family in Damascus. He practised in Cairo where he was a friend of MAIMONIDES' son ABRAHAM. He died in 1270 A.D. All these four were Muslims. The Christian historian GREGORIUS ABU'L-FARAJ called BARHEBRAEUS (because he was the son of a baptized Jewish physician) wrote in his Syriac and Arabic "History of the Empires" (5) much

(*) Lecture given at the Hebrew University (Jerusalem) on March 24, 1936.

(1) *Kitāb al-Fihrist*. Mit Anmerkungen herausgegeben von Gustav FLUEGEL. vol. I, Leipzig 1871 (*Fihr.*).

(2) *Kitāb Ṭabaqât al-Umam* ou Les Catégories des Nations. Par ABOU QÂSIM IBN ṢÂ'ID l'Andalous. Publié avec notes et tables par le P. LOUIS CHEIKHO. Beyrouth 1912 (*Ṭabaqāt*). French translation by R. BLACHÈRE in *Publications de l'Institut des Hautes Études Marocaines*, N°. 28 (Paris 1935).

(3) IBN AL-QIFṬĪ's *Ta'rīḫ al-Ḥukamā'*. Auf Grund der Vorarbeiten AUG. MUELLER's herausgegeben von JULIUS LIPPERT. Leipzig 1903 (IQ).

(4) IBN ABĪ UṢAIBI'A, *'Uyūn al-Anbā' fī Ṭabaqāt al-Aṭibbā'* (IAU). Herausgegeben von AUGUST MÜLLER. Cairo 1882 and Koenigsberg 1884. 2 vols.

(5) GREGORIUS ABU'L-FARAJ (IBN AL-'IBRĪ), *Ta'rīkh Mukhtaṣar ad-Duwal*. Ed. Anṭūn Ṣālḥānī. Beyrouth 1890.

about medical men, but what he wrote is mostly extracted from IBN AL-QIFṬĪ. Two other biographical works are of lesser importance for our task : IBN KHALLIKĀN's *Wafayāt al-A'yān*, (6) completed in 1274 A.D., and HĀJJĪ KHALĪFA's *Kashf az-Zunūn* (7), an enormous encyclopaedia of the entire Arabic literature, concluded in 1654. They are useful on some rare occasions. Outlines and summaries of these works have been given by LUCIEN LECLERC, the author of the great "*Histoire de la médecine arabe*" (8) and still more completely by MORITZ STEINSCHNEIDER in his two famous books : *Die hebräischen Uebersetzungen des Mittelalters* (9) and *Die arabische Literatur der Juden* (10). BROCKELMANN's History of Arabic Literature is well-known (11). Recently, Dr. GEORGE SARTON gave many most useful bibliographical notes in his *Introduction to the History of Science* (12).

I will try to give in this lecture a sketch from the very sources themselves, utilising the afore-mentioned Arabic works and the manuscripts of Jewish Mediaeval physicians as far as they are at my disposal. I must confess however that the number of original works which are accessible to me is restricted by the fact that I live in Cairo, which still does not possess a first-rate Oriental Library. A further restriction consists in my constant lack of time owing to my manifold occupations. So I have to apologize, if there should be gaps in my communication.

There is unhappily no Jewish Mediaeval historian who undertook to write in detail the history of the many hundreds of Jewish

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(6) IBN KHALLIKĀN, *Wafayāt al-A'yān*. Ed. F. WÜSTENFELD (Goettingen 1835-43) and Cairo-Bûlâq 1275 and later, in 2 vols. English Translation IBN KHALLIKĀN's *Biographical Dictionary*, transl. by M. G. DE SLANE (London 1843-71) (I Kh).

(7) *Lexicon bibliographicum et encyclopaedicum a* ... HADJI KHALFA ... *compositum*. Ed. GUSTAVUS FLUEGEL. Leipzig & London. 1835-58. 7 vols. (HKh).

(8) LUCIEN LECLERC, *Histoire de la médecine arabe*. Paris 1876, 2 vols. (LECL.)

(9) M. STEINSCHNEIDER, *Die hebraeischen Uebersetzungen des Mittelalters und die Juden als Dolmetscher*. Berlin 1893.

(10) The same, *Die arabische Literatur der Juden* (Bibliotheca Arabico-Judaica). Frankfurt a.M. 1902.

(11) C. BROCKELMANN, *Geschichte der arabischen Literatur*. Weimar & Berlin 1898-1902. 2 vols. A supplement is being published since 1936.

(12) GEORGE SARTON, *Introduction to the History of Science*. Baltimore 1927-1931. 2 vols.

physicians who distinguished themselves in Oriental lands (13). We are obliged to compile the dates from the afore-mentioned works and from the writings of the Jewish authors themselves, as far as they are accessible. Very few of their books have been published in the original texts, and so we have to examine the available MSS. and the Mediaeval Latin translations and depend on them for our information. But this is a task which demands the common and combined effort of many scholars, and it is, consequently, still not possible to write a real history of the Jewish physicians in the Near East. We must confine ourselves to give a bio-bibliographical sketch of some of the most prominent amongst them. It is this only that I am able to offer in this concise lecture.

Before beginning I have to mention that the period preceding the Arabic conquest does not furnish any information about Jewish physicians. Those living in the Byzantine Empire bore Greek names and so are not to be distinguished from their Christian contemporaries. Those who lived in the Sasanian (Persian) empire are as unknown as their colleagues belonging to other religions, because the bulk of the Middle Persian literature is lost. A considerable amount of medical knowledge, independent from Greek sources, is to be found in the Talmud. But we do not meet any names of medical men in this collection of religious laws and prescripts.

After the Arabs had overturned, in the VIIth century A.D., the Byzantine and Persian domination in North Africa and Asia they utilized the administrative and social institutions of the highly civilized lands into which they had newly come as conquerors. During the first century after their conquest they were unable to devote themselves to the study of the sciences in which their new subjects excelled. But from the beginning of the VIIIth century the learning-period of the Arabs set in, utilizing the medical learning which came from two places : from Alexandria in Egypt and from Gondē-Shāpūr in South-west Persia. The medical school in this latter town was a foundation

(13) The Rabbi Dr. I. MÜNZ wrote a short History : *Die juedischen Aerzte im Mittelalter. Ein Beitrag zur Kulturgeschichte des Mittelalters* (Frankfurt a.M. 1922). But the part concerning Jewish physicians in the Orient is very much abridged and mostly based on the afore-mentioned European works.

of the Sasanian king SHĀPŪR II. (IVth century A.D.) who established it under the direction of a Greek physician THEODOSIOS. It took a great development in the next centuries when Greek philosophers from the old Platonic Academy in Athens and Nestorian (Christian) scholars from Edessa, expulsed by the intolerance of Byzantine emperors, seeked refuge in Persian territory. At the time of the Prophet MUḤAMMAD's birth (ab. 570 A. D.), the school of Gondē-Shāpūr was at the height of its glory, the convergence-point of Greek, Persian and Indian learning. The means of understanding was largely the Syriac (late eastern Aramaic) language. The other place was Alexandria, where the famous libraries had been destroyed long before the Arabic invasion — the narrative of the fire started by the Arabs at the order of the caliph ʿUMAR is a legend — where there existed still a shadow of the old world-famed medical school. At the time of the Arab conquest the Alexandrian Greek physicians were only compilers, busy to summarize the works of HIPPOCRATES and GALEN and to transform them into compendiums for the use of superficial education. Their works were, however, made accessible to the Arabs by translations, during the IXth century, and gave the Arabic medical (and philosophical) learning its decidedly scholastic turn (14).

At the very beginning of the medical learning of the Arabs stands the figure of a Jewish physician, the only one about whom we have any information in this early period. His name is MĀSARJAWAĪH or MĀSARJŌYAH (15), a Persian name; he was born in Baṣra (Mesopotamia). The Arabic chroniclers say that he was of Syrian mother-tongue and that he translated an important Syriac medical book into Arabic. He lived under the reign of the Umayyad Caliph ʿUMAR B. ʿABD AL-ʿAZĪZ (first decades of the VIIIth century A.D.), and this ruler charged him to translate into Arabic the "Medical Pandects", a great compendium in thirty parts which had been composed by the Syriac priest and

(14) See M. MEYERHOF, *Von Alexandrien nach Baghdad. Ein Beitrag zur Geschichte des philosophischen und medizinischen Unterrichts bei den Arabern.* In Sitzungsber. d. preuss. Akad. d. Wiss., Phil.-hist. Klasse, (Berlin 1930) XXIII p. 389 — 429.

(15) Fihr. 297; IQ 324; IAU I 163 foll.; LECL. I 81 foll.; STEINSCHN. Arab. Lit. N°. 16.

archiater AHRŌN a short time before the Arabic conquest. This compendium had, later on, a great reputation in the Islamic world; it was probably the first comprehensive book on medicine to come into the hands of Muslim physicians. But MĀSARJAWAIH produced also some medical treatises of his own : one on the properties of aliments, another on the properties of remedies, and a third one on the eye. All these three works are lost. The first two, however, are so frequently quoted that we can form an idea about their value. MUḤAMMAD B. ZAKARIYYĀ' AR-RĀZĪ the great Persian physician, composed in the years before his death (925 A.D.) an enormous encyclopaedia of therapeutics which he left unfinished. His pupils edited it in about twenty volumes under the name of *Al-Ḥāwī fi't-Ṭibb*, i. e. "the Comprehensive Book on Medicine" (16). In it, MĀSARJAWAIH is cited very often under the name of AL-YAHŪDĪ ("the Jew"); consequently, he was known to the West by the Latin translation of the same book (*Rhazis Continens Medicinae*) as JUDAEUS. All the following generations of Arabic physicians quoted MĀSARJAWAIH's works, but mostly the authors of books on simple drugs. I mention here only two of the most prominent amongst them, AḤMAD AL-GHĀFIQĪ (in Cordova, about 1160 A.D.) and IBN AL-BAIṬĀR (born in Malaga, lived in Egypt, died in Damascus in 1248 A.D.). They quote MĀSARJAWAIH very often under his name, and we can see that he had not only a good knowledge of the drugs and aliments known to the Greeks, but also of very many which were imported from the Orient, especially from India. These drugs entered into the pharmacopoeia of the Persians and Arabs and became known to Europe by the Levant commerce, as e.g. musk, camphor, anacardia, galingale, purging cassia, rhubarb, and the like. The entire list of several hundreds of new remedies appears in the works of MĀSARJAWAIH, as cited by his successors. I have to mention that there exists in the Aya Sofya Library in Istanbul a short MS. (nº 4838) entitled *Kitāb fī Abdāl al-Adwiya* ("Book on the Substitutes for Remedies") ascribed to MĀSARJAWAIH. I examined this MS. and found that it is a very poor summary extracted from early Arabic medical books. MĀSARJAWAIH's translation of AHRŌN's Compendium had also a great success in

(16) See SARTON, *Introduction* I 609 foll. and P. KRAUS & S. PINES, Art. *al-Rāzī* in *Encyclopaedia of Islam* III (Leiden & London 1936) 1134-6.

influencing the works of later Arabic physicians; it is still more quoted even than MĀSARJAWAIH's own output. And this, notwithstanding and although there is severe judgment on the language of this translation by the great Persian physician ʿALĪ B. AL-ʿABBĀS (died 982 A.D.) in the introduction to his great "Perfect book of the Medical Art" (17). But we must not forget that in the early period of the Islamic rule Arabic was a foreign language to all the new subjects of the Caliphs.

MĀSARJAWAIH left a son named ʿISĀ of whom we do not know anything besides the title of two of his works, a book on colours and a book on odours and flavours (18). So he was probably one of the first authors who wrote in Arabic on the physiology of the organs of the senses. IBN AL-QIFṬĪ mentions a Jewish physician wearing the Syriac name FURĀT B. SHAHNĀTHĀ (18 a). He was a pupil of the Christian practitioner THIYĀDŪQ (THEODOKOS ?) who was the medical adviser of the powerful statesman AL-ḤAJJĀJ B. YŪSUF (d. in 714). FURĀT became at the end of his long life the friend and adviser of the Abbassid prince ʿISĀ B. MŪSĀ (ab. 760) who held him in the greatest esteem. In sum, we see three Jewish physicians at the threshold of the great translation period which followed during the second half of the VIIIth and the entire IXth century, under the reign and with the material help of the Abbassid caliphs. These caliphs transferred the centre of the empire from Damascus to Baghdad and the centre of medical studies from Gondê-Shâpûr to the same town on the banks of the Tigris where they founded hospitals and translation schools. We know more than one hundred names of translators from Greek and Syriac into Arabic belonging to this period. They were nearly all Nestorian or Jacobite Christians, and although their names sound sometimes Jewish, e.g. MŪSĀ IBN ISRĀ'ĪL — their Christian faith is expressly witnessed to by the chroniclers. This arises from the fact that the main centres of Greek learning were the numerous Syriac convents of Mesopotamia and Persia. A prominent Persian physician who lived about 850 A.D., ʿALĪ IBN RABBAN AṬ-ṬABARĪ, was designated by the bibliographers as a Muslim

(17) *Kāmil aṣ-Ṣinā'a aṭ Ṭibbiyya*, ed. Cairo-Būlāq 1294 A. H. p. 4.
(18) Fihr. I 204; IQ 247; IAU I 204.
(18 a) IQ 255 foll.

renegade of Jewish origin (19). This has been found to be an error. The chroniclers thought the honorific title of his father to be Hebrew; but *Rabban* is a Syriac word which means "our Master" like the Hebrew word *Rabbēnu*. MINGANA and MARGOLIOUTH proved that SAHL, 'ALĪ's father, a physician and astronomer, was a Christian of East Persian origin, and not a Jew (20).

About the same period, viz. in the middle of the IXth century A. D., was born in Egypt the greatest Jewish medical man of the Middle Ages, ISḤĀQ B. SULAIMĀN AL-ISRĀ'ĪLĪ, known to the Jews as *Yizḥāq ha-Yisrāēli* and to the Latin West as ISAAC JUDAEUS (21). He was at first an oculist in Cairo, but was nominated as physician in ordinary at the court of ZIYĀDAT-ALLĀH III., the last Aghlabid ruler of Cairuan (Tunisia). Although the other physicians and the whole court were hostile to him, ISḤĀQ succeeded very soon in creating for himself a strong position, owing to his superior intelligence and medical skill, and when the Aghlabids were overthrown by the Fatimids, in 909 A. D., he kept his post under the first three caliphs of the victorious dynasty. IBN KHALDŪN, the famous historian, gives a lively narrative of how ISḤĀQ tried to prolong the life of AL-MANṢŪR ISMĀ'ĪL, the caliph who died in 945, owing to the untimely administration of a strong soporific by an inexperienced practitioner, and then saved the life of his imprudent colleague by his disinterested and confraternal intercession. This is quite in accordance with one of the aphorisms which are ascribed to ISḤĀQ : "Don't open your mouth to condemn if something happened to a physician; as everyone is overtaken by his hour. You ought to gain praise by your own accomplish-

(19) See about him M. MEYERHOF, *'Alī ibn Rabban aṭ-Ṭabarī, ein persischer Arzt des 9. Jahrhunderts n. Chr.* In ZDMG vol. X (1931) 38-68. And M. MEYERHOF, *'Alī aṭ Ṭabarī's "Paradise of Wisdom", one of the oldest Arabic Compendiums of Medicine.* In *Isis* XVI (1931) 6-54.

(20) A. MINGANA, *The book of Religion and Empire..... by 'Alī Ṭabarī.* Manchester etc. 1922; Arabic Text printed in Cairo 1342 A.H. (1923); D.S. MARGOLIOUTH, *On "The Book of Religion and Empire" by 'Alī b. Rabban aṭ-Ṭabarī.* In *Proceedings of the British Academy* vol. XVI (London 1930); M. BOUYGES, 'ALIY IBN RABBAN AṬ-ṬABARIY. In *Der Islam* vol. XXII (Berlin & Leipzig 1935) 120 foll.

(21). IAU II 36 foll.; Lecl. I 409-12; STEINSCHN. Hebr. Uebers. 388-402; STEINSCHN. Arab. Lit. No. 28; BROCKELM. I 237 foll. and Suppl. I 421; SARTON, Introd. I 639 foll.

ments, but you shall not seek to obtain honour by the disgrace of others!" ISḤĀQ AL-ISRĀ'ĪLĪ was taught by ISḤĀQ B. 'IMRĀN who was the most celebrated Muslim physician in Tunisia where he had introduced the Greek medicine from his home town Baghdad. On the other hand, ISḤĀQ AL-ISRĀ'ĪLĪ himself formed several famous pupils of whom we will speak afterwards. He reached, according to the reports of all the chroniclers, an age of more than a hundred years. He was unmarried and left no son. When he was asked about the reason, he answered : "I left four books which will perpetuate my memory better than children, my treatises 'On Fevers', 'On Aliments and Remedies', 'On Urine' and 'On Elements'." He was right, as these four books were held in high esteem by the Oriental physicians, and later on by those of Europe after their early translation into Latin, which was accomplished by the Tunisian renegade CONSTANTINE THE AFRICAN, in the convent of Monte Cassino in Italy about 1080 A. D.). Others were translated in the XIIth century at Toledo by the famous translator GERARD OF CREMONA. The entire translated output of ISḤĀQ B. SULAIMĀN was printed in Venice in 1515 under the title *Opera omnia Isaaci filii Salomonis.* The book on fevers and the book on urine were long considered as classics by the Arabs as well as by the European scholars. They were also translated into Hebrew, partly from the Arabic text, and partly from the Latin translations. STEINSCHNEIDER gave all the details about these translations in his celebrated book *Die hebräischen Uebersetzungen des Mittelalters* (Berlin 1893, paragraph 479). ISḤĀQ composed also treatises on melancholy and on dropsy which were less famous than the first mentioned four books. About his treatise *On Fever* 'ALĪ IBN RIḌWĀN, the most prominent Muslim physician of Egypt in the XIth century A. D. and a severe critic, says : "I declare that this book is most useful and the work of a man of rare merit. I treated my patients according to the prescriptions of this book and I did not find anything to be added". IBN ABĪ UṢAIBI'A who relates this adds for himself : "There does not exist any book concerning this matter better than the book in question." It is impossible for me to quote all the authors who cited ISḤĀQ's books. He is continually being quoted, especially by RHAZES, as *al-Isrā'īlī* and in Latin as *Israelita* and *Isaac Judaeus.* As to his rather

numerous philosophical works they were less appreciated, and MAIMONIDES himself declared later on that ISḤĀQ was a prominent physician, but a poor philosopher. Among his philosophical treatises which exist only in Hebrew translation I mention the *Sēfer ha-Rūaḥ we-ha-Nefesh* (Book of Spirit and Soul). He wrote, moreover, a commentary on the *Yeṣīrā*, the "Book of Creation". It must be stated that nothing of ISḤĀQ's scientific output has been edited in the original Arabic text and only two minor philosophical writings (the books on Elements and on Definitions) have been printed in Hebrew translations. In fifteen years about one thousand years will have elapsed since the death of this great Jewish scholar whose fame was world-wide during and even after the Middle-Ages. It should be a point of honour with the Hebrew University to celebrate this date by the beginning of a comprehensive edition of the works of ISAAC ISRAELI.

He left two prominent pupils, one of them a Muslim IBN AL-JAZZĀR (22) whose works were early translated into Latin along with those of his master. The other was DŪNASH (or ADŌNĪM) HA-BĀBLĪ B. TAMĪM (23), friend and successor of ISḤĀQ B. SULAIMĀN at the court of Cairuan. He composed a book on simple drugs from which IBN AL-BAĪṬĀR quoted three passages. The original is lost. He was, moreover, a distinguished mathematician and astronomer who wrote on Indian calculation and on astronomy for the Fatimid caliph AL-MANṢŪR, and on the Jewish calendar for his famous contemporary the Jewish diplomat, minister of Finance and physician ḤASDĀY B. SHAPRŪṬ at the court of Cordova in Spain. He was, moreover, occupied with philosophical works, and composed a Hebrew grammar and, like his master, a commentary on the *Yeṣīrā*. The date of his death is unknown.

We are not concerned here with the Mediaeval Jewish physicians of the West, but I have to mention that ḤASDĀY B. SHAPRŪṬ of Jaen in Spain (24) has the great merit to have revised, about 950 A.D., the Arabic translation of DIOSCURIDES' Greek *Materia Medica*, with the help of a Christian monk and some Muslim

(22) IAU 37-39; LECL. I 413-16; BROCKELM. I 238; Supp. I 424 .

(23) MUNK, *Notice sur* IBN DJANAH. In *Journal Asiatique* 1850 p. 54 foll. LECL. I 416 foll.; STEINSCHN. Hebr. Uebers. 395-99; STEINSCHN. Arab. Lit. No. 36.

(24) IAU II 47, 50; STEINSCHN. Arab. Lit. No. 72; Lecl. I 457 foll.

physicians and herbalists, and to have identified most of the Greek drug-names with those known to the Arabs (25). Half a century later, YŌNĀH B. JANĀḤ (d. 1040 A.D.) the famous Jewish grammarian of Saragossa (26), composed a glossary of drugs in many languages. It has not come down to us, but is quoted by several later authors, e.g. by MAIMONIDES (27). Another Hispano-Jewish physician followed in his steps : YŌNĀH B. BIKLĀRISH (d. in Saragossa in 1100) (28); his glossary of drugs will be edited one day by Dr. RENAUD of Rabat (Morocco). May I mention, moreover, ĀSĀF HA-YEHŪDĪ (29) the author of the well-known Hebrew *Sēfer Rephūōt* ("Book of Healing") who lived probably in the West in the IXth century. Nothing is known of his life.

Another Jewish physician who belongs more the to West than to the East and who wrote in Hebrew is SHABBATAI BEN ABRĀHĀM BEN YAEL, better known under his nickname DONNOLO (30). He was born in South Italy in 913 A.D., captured as a young child by Saracenic pirates and taken to the then Arabic town Palermo where he studied Arabic and medicine. He then practised again on the mainland of Italy where he wrote his *Sēfer ha-Yāqār* ("The Precious Book") an antidotarium of 120 drugs, mostly based on Greek pharmacology.

In the East, there begins the flourishing period of the Jewish physicians in the XIth century, especially in Egypt, which had been conquered by the Fatimids in 969 A.D., to remain during two centuries under the powerful and peaceful domination of

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(25) See M. MEYERHOF, *Die Materia Medica des Dioskurides bei den Arabern.* In *Quellen u. Studien z. Geschichte d. Naturwiss. u.d. Medizin* III (Berlin 1933) 72-84.

(26) STEINSCHN. Hebr. Uebers. 917-20; STEINSCHN. Arab. Lit. No 81.

(27) M. MEYERHOF, *Sur un glossaire de matière médicale composé par Maimonide.* In *Bulletin de l'Institut d'Égypte* vol. XVII (Le Caire 1935) 223-35.

(28) IAU 52; STEISCHN. Arab. Uebers. No. 99; see, moreover : H.P.J. RENAUD, *Trois études d'histoire de la médecine arabe en Ocident* I. *Le Musta'īnī d'ibn Beklāres.* In *Hespéris* (Paris 1931) 135-150.

(29) SARTON Introd. I 614; R. GOTTHEIL, Art. in *Jewish Encyclopedia* vol. II (1902) 162; L. VENETIANER, ASAF JUDAEUS, *der aelteste medizin. Schriftsteller in hebraeischer Sprache.* Budapest 1915-17; MÜNZ p. 8; ISIDORE SIMON, ASAPH HA-IEHOUDI, *médecin et astrologue du Moyen Age. Paris* 1933.

(30) R. GOTTHEIL, Art. *Donnolo* in *Jewish Encyclopaedia* vol. IV (1903) 639. SARTON, *Introduction* I 682 foll.

this Shi'ite dynasty. Palestine and Syria fell into their hands at the same time, but were disturbed later on by the Crusades. All the Fatimid caliphs of Egypt and Syria had very friendly dispositions towards Jewish physicians and appointed many of them to their courts.

The very first Fatimid ruler of Egypt, the caliph AL-MU'IZZ LI-DĪN ALLĀH appointed, immediately after the conquest of Egypt, the best Jewish practitioner of Cairo-Fusṭāṭ, MŌSHĒ BEN ELĒ'ĀZĀR, to be his physician in ordinary (31). MŌSHĒ composed for the ruler a treatise on remedies and another one on cookery, and died in 974 A.D. His two sons and his grandson also occupied medical posts at the court, although they remained faithful to the Jewish religion. On the contrary, MŌSHĒ's brother was converted to the Islamic faith and adopted a Muslim name. Caliph AL-ḤĀKIM (996-1020 A.D.) — who later on lost his reason — in spite of his apparent hatred against misbelievers, had in his service a Jewish physician AL-ḤAQĪR (32) to whom he gave the honorific title *an-Nāfi'* ("the Useful"), and nominated him at his court, after he had cured within three days a chronic ulcer in one of the caliph's favourites. The other court-physicians had not been able to bring the wound to a healing. AL-ḤAQĪR was — which is rare in Mediaeval Jewish medical men — a specialist in surgery. The chroniclers do not give any other dates concerning his life.

We mentioned already that the greatest physician in Egypt during the XIth century was 'ALĪ IBN RIḌWĀN, a Muslim from Gīza near Cairo (33). His most prominent pupil was a Jew, mentioned by IBN ABĪ UṢAIBI'A (34) as EPHRĀ'IM IBN AZ-ZAFFĀN ("the son of the hymn-singer", perhaps son of a *ḥāzān*?). He, too, was a physician in ordinary at the court of several Fatimid caliphs in Cairo during the second half of the XIth century,

(31) IQ 320; IAU 86. M. MEYERHOF, *Notes sur quelques médecins juifs égyptiens qui se sont illustrés à l'époque arabe*. In *Isis* XIII (1929) 122.

(32) IAU II 89; IQ 178.

(33) M. MEYERHOF & J. SCHACHT, *The medico-philosophical Controversy between* IBN BUṬLĀN *and* IBN RIḌWĀN. Cairo (Egyptian University, Faculty of Letters) 1937.

(34) IAU II 105 foll. See. moreover, M. MEYERHOF, *Ueber einige Privatbibliotheken im fatimidischen Aegypten*. In *Rivista degli Studi Orientali* XII (1930) 287-8.

who conferred on him honours and gave him rich salaries. This enabled him to collect a great private library mostly of medical manuscripts. He himself copied valuable books, but maintained also the best Muslim copyists of Cairo. So he was able to sell to the vizier AL-AFḌAL about ten thousand volumes and to leave nevertheless at his death another twenty thousand! IBN ABĪ UṢAIBI'A relates to have seen, two centuries after EPHRĀ'IM's death, manuscript volumes bearing his *ex-libris*, and a book composed and written by him. His scientific output was not important, mostly compilations from elder authors. We have in the Cairo National Library a photostat from an Istanbul MS. of EPHRĀ'IM's "Recommendations for the Composition of Medicines", a short treatise which he composed for the Shaikh ABU'L-QĀSIM, one of his medical pupils. It contains some practical advice without pretending in any way to scientific aims.

His best pupil was again a Jewish physician SALĀMA B. RAḤAMŪN (35) who studied medicine a long time under his guidance. He was at the same time the pupil in philosophy of the learned Fatimid prince AL-MUBASHSHIR B. FĀTIK who was, like EPHRĀ'IM, a great collector of scientific manuscripts in this period of high literary life in Cairo. The esteem in which SALĀMA was held is witnessed by ABU'Ṣ-ṢALT UMAIYA one of the most distinguished physicians of Spain who came to Egypt in 1096 A.D. and made friends with the Jewish practitioner. UMAIYA, in the narrative of his journey, speaks in high terms of his medical and philosophical erudition. SALĀMA wrote a certain number of metaphysical and medical books which have not come down to us. The title of one of them is : "On the reason of the scarcity of rain in Egypt", and that of another treatise : "Why the women of Cairo become obese at the end of the young years". We may mention here that SALĀMA left a son named MUBĀRAK (35 *a*) who became a distinguished medical practitioner and who wrote a book on a certain kind of severe anthrax.

Now follows the XIIth century during which the number and the importance of Jewish physicians reached a very high level. In spite of the Crusades and the increasingly hostile feelings of the

(35) IQ 209 foll.; IAU II 106 foll.; STEINSCHN. Ar. Lit. No. 143.
(35a) Ibid. No. 144.

Muslims against unbelievers, there were many Jewish and Christian physicians in high offices. In Persia and 'Irâq the Christians were predominant in Medicine, and the two most prominent Jewish physicians of this period were converted to the Islamic faith. One of them is SAMAW'AL IBN YAḤYĀ (SHEMŪ'ĒL BEN YEHŪDĀ) (36) whose family immigrated from Morocco to Syria and who lived later on in Marāgha (Adherbaijān). His story will be written by your distinguished scholar AVINOAM YELLIN, and so I may pass on to the other of this pair, ABU'L-BARAKĀT HIBAT-ALLĀH (NATHANAEL) B. MALKĀ (37). He studied medicine under great difficulties with SA'ĪD B. HIBAT-ALLĀH, one of the famous doctors of Baghdad. He became a distinguished philosopher and practitioner, was called by the honorific name of *Awḥad az-Zamān* ("Unique of his time") and consulted by many Muslim princes. His unsociable character drove him into quarrels with his Christian colleague IBN AT-TILMĪDH, and later on induced him to adopt the Islamic religion, because he found himself despised as a Jew. His old age was very sad; he became blind, deaf and leprous and died in deep misery. He left a prominent philosophical work *Al-Mu'tabar* ("the Esteemed Book") which is a great compendium of metaphysics and physics. It is being studied at the present by Dr. PAUL KRAUS in Paris, who is very enthusiastic about the intelligence and style of the author who was a successor of RHAZES in his Platonic conceptions of philosophical thought.

Much better was the position of the Jewish physicians in the lands under Fatimid rule. In Egypt one of the most distinguished practitioners was HIBAT-ALLĀH (NATHANAEL) IBN JUMAI' AL-ISRĀ'ĪLĪ (38) bearing the honorific title of *Shams ar-Ri'āsa* ("Sun of the Authority"). He won an enormous reputation by bringing back to life a man who was apparently dead and who was carried near the doctor's office on a bier. IBN JUMAI' had observed that the feet of the individual standing out from under the hearse-cloth were erect and not lying as those of a dead body. He served the last Fatimid caliph and later on the great SALADIN the founder

(36) IQ 209; IAU II 30 foll.; ABU'L-FARAJ 408; STEINSCHN. No. 149.
(37) IQ 343-6; IAU I 278-80; STEINSCHN. Ar. Lit. No. 147.
(38) IAU II 112-5; STEINSCHN. Ar. Lit. No. 145.

of the Aiyubid dynasty (1171-93). He composed many books, on remedies, on the climate of Alexandria, on first aid in diseases, on colic, etc. His most conspicuous work is a treatise : "Direction for the Improvement of Souls and Bodies", in four books. Manuscripts of this book are not rare. I was lucky enough to buy, not so long ago, a fragment containing about half of this book. It is an excellent and comprehensive compendium of anatomy, physiology, hygiene and pharmacology, compiled from the best available sources. This work was dedicated to the *Qāḍī al-Fāḍil* ("Excellent Judge") 'ABD AR-RAḤĪM B. 'ALĪ AL-BAISĀNĪ who was vizier to the last Fatimids, but afterwards a faithful servant to SALADIN and his sons. He was a great lover and protector of Jewish physicians of whom about a dozen came by his influence to high positions at the court of Aiyubid rulers (38 *a*).

Another prominent Jewish physician of the same period was the Karaite ABU'L-BAYĀN AS-SADĪD B. AL-MUDAWWAR (39) who likewise served the last Fatimids and then SALADIN who continued to pay him a pension when the physician was old and unfit for service. SADĪD died in 1184 at the age of over eighty. He formed many pupils and was consulted by the princes of the ruling houses as well as by foreign sovereigns. His best known book is "On Medical Experience"; it is lost.

Another contemporary of the foregoing was ABU'L-FAḌĀ'IL MUHADHDHIB IBN AN-NĀQID (40) who was born in Cairo — son of a *nāqid* or Chief Rabbi, as indicated by his name — and died there in 1188. He was at first a general practitioner but later devoted himself entirely to ophthalmic surgery. IBN ABĪ UṢAIBI'A heard from his father who was the colleague of ABU'L-FAḌĀ'IL a narrative illustrating the charitable mind of this oculist. A poor Jew came to him and asked for help. The practitioner had him seated in his consultation room and promised to him the receipts of the whole day. He put the fees from the patients into a set of eye-salve jars. In the evening he opened the many papers in them and found gold- and silver-pieces for the value of over three hundred drachms which he remitted to the supplicant. He added that he never knew who gave him gold or silver

(38a) See below, note 44.
(39) IAU II 115; STEINSCHN. Ar. Lit. No. 153.
(40) IAU II 115 foll; STEINSCHN. Ar. Lit. No. 151.

and that he treated all his patients alike. His son ABU'L-FARAJ became an esteemed oculist, as his father, but changed over to the Muslim religion.

A fourth practitioner of this series was HIBAT-ALLĀH (i.e. NATHANAEL), surnamed *ar-Ra'īs* ("the Chief") who died about 1185 (41). He too, served the last Fatimid caliphs who gave him a pension sufficient to assure his livelihood even after the fall of their sovereignty.

A fifth one was AL-MUWAFFAQ B. SHAW'A (42), a very talented Jew, learned not only in different branches of the healing art, medicine, surgery and ophthalmology, but also a gifted poet and musician. He died in 1184.

The next in age of the Jewish physicians in Egypt is no other than MŪSĀ B. 'UBAIDALLĀH B. MAIMŪN (MŌSHĒ BEN MAIMŌN) or MAIMONIDES the outstanding figure of the whole century (43). So much has been written about his life and works during the year 1935 when we celebrated the 800th anniversary of his birth that I may content myself with a very brief survey of his medical life. Born in Cordova in 1135 he left this town in 1148 with his family on account of religious persecution, had an errant life during the following ten years where he nevertheless began his serious theological, philosophical and medical studies, and settled down in Fez. It is probable that he studied there the works of HIPPOCRATES and GALEN and that he had practical instruction in medicine from several physicians. A renewed religious persecution forced the MAIMŌN family to leave Morocco and to seak refuge in Palestine. There, however, the war between Muslims and Crusaders was going on, and so the family migrated to Egypt and settled down in Fusṭāṭ (the southern suburb of Cairo) in 1165. MŌSHĒ saw himself obliged, by the successive deaths of his father and his younger brother, to practise medicine

(41) IAU II 116; STEINSCHN. Ar. Lit. No. 147.

(42) IAU 116. For all these physicians see, moreover, my essay (note 31).

(43) Very much has been published about MAIMONIDES as a physician. I tried to give a bibliography of the most valuable publications, especially those of the late Rabbi HERMANN KRONER, in : M. MEYERHOF, *L'œuvre médicale de* MAIMONIDE, in *Archivio di Storia della Scienza* (*Archeion*) XII (1929) 136-155. An enlarged English publication with extracts from original texts will follow in the course of this year 1937 under the title "The medical Work of MAIMONIDES" in the papers of Columbia University (New York).

for the support of his family. He must have witnessed the great fire of Fusṭāṭ set alight by the Egyptians in November 1168 at the approach of the Crusaders. The town was, however, soon rebuilt and re-inhabited, and MŌSHĒ passed the rest of his life in this suburb. He attracted quickly the attention of the QĀḌĪ AL-FĀḌIL (44), the great protector of Jewish physicians, and was recommended to the court of the last Fatimid caliph AL-ʿĀḌID. In 1171, after the fall of this ruler, MŌSHĒ was recommended to the new sultan SALADIN and appointed to his court. He must have been the colleague and friend of the afore-mentioned five Jewish court physicians, but no mention of their names is found in his medical works. Now follow the years of MAIMONIDES' superhuman activity as a *nāqid* of the Jewish community, as a theological, philosophical and medical adviser and as a writer who won a worldwide reputation. After the death of SALADIN (in 1193) there followed a time of quarrels and wars between his successors, and in 1198, his eldest son AL-AFḌAL NŪR AD-DĪN ʿALĪ took possession of the throne of Egypt. He appointed MAIMONIDES to be chief physician at his court which obliged the famous scholar to contribute still more additional work of which he gave himself a lively description in his well-known letters to SAMUEL BEN TIBBŌN and to JOSEPH BEN ʿAKNĪN. The continuous strain very soon had a deleterious result on MAIMONIDES' health, and he died on December 13, 1204 at the age of sixty-nine solar years.

We are acquainted with ten of MAIMONIDES' medical writings which are all written in Arabic, though most were translated very soon into Hebrew and Latin. Three of them, extracts from GALEN's works, a commentary on HIPPOCRATES' *Aphorisms*, and MAIMONIDES' own *Aphorisms* (*Fuṣūl Mūsā* in Arabic, *Pirqē Mōshē* in Hebrew) follow entirely the lines of Greek medicine which was for Maimonides the beginning of all learning. According to his own words in the introduction to his *Aphorisms* he composed them in order to explain the meanings of the ancient masters and to make remembrance easier. He did it for educational purposes, although he had no time to do hospital service

(44) IKh (Wüstenf.) No. 384, 857; BROCKELMANN, Art. AL-ḲAḌĪ AL-FĀḌIL in *Encyclopaedia of Islam* II 608 foll. ; A. H. HELBIG, AL-QĀḌĪ AL-FĀḌIL, *der Wezier* SALADIN's, *eine Biographie*. Diss. Heidelberg, Leipzig 1908.

or to give practical instruction to pupils. But it is certain that he read the medical classics with friends or younger colleagues.

Six others of MAIMONIDES' medical writings were written at the request of sultans, princes or of his protector the QĀḌĪ AL-FĀḌIL. They are short treatises (*maqālāt* = discourses) blended from the sayings of the great physicians of bygone times, Greeks or Arabs, with his own practical experience. One is on haemorrhoids, another on asthma, a third on sexual intercourse and the fourth on poisons. The latter two themes were frequently demanded by rulers or high personages from their medical advisers, because the question of harems and the fear of being poisoned were the most frequent preoccupations of such high-placed men.

The following two treatises were written by MAIMONIDES during his office as chief physician at the court of the sultan AL-AFḌAL, in 1198 and 1200. They are treatises on general hygiene with special reference to the attacks of melancholy and dejection to which the ruler, a frivolous and pleasure-seeking man of thirty, was frequently subjected. Both of them are remarkable by the fact that MAIMONIDES not only gave a summary of Greek and Arabic rules of hygiene and a complete regulation for every hour of the day of his royal patient, but that he reveals himself as an independent "hygienist of the soul". In the first treatise *Fi Tadbīr aṣ-Ṣiḥḥa* ("On the Regulation of Health") (45) e.g. he exhorts the Sultan not to overrate the happenings of this life and continues : "The humble servant only gave advice by these regulations, in order to explain how the soul may get accustomed to resist passion by considering the ethical books, the literature on the rules of the religious law and the sermons and wise sayings of the sages; until the soul is strengthened and sees the right as right and the idle as idle. In this way the passions diminish, the bad thoughts disappear, the unsociableness is removed, and the soul is gladdened in spite af all the tribulations which may happen to a man". In the last treatise *Maqāla fī Bayān al-Aʿrāḍ* ("Discourse on the Explanation of the Fits") (46)

(45) Edited in Arabic with a German translation by HERM. KRONER in *Janus* vol. 27-29 (Leyden 1924-5).

(46) Edited and translated by the same author in *Janus* vol. 32 (Leyden 1928) 12-116. See, moreover : HERM. KRONER, *Die Seelenhygiene des* MAIMONIDES. Stuttgart 1914.

MAIMONIDES mentions that he was suffering from ill-health himself and unable to attend at the court. He answers in twenty-two chapters all the questions laid before him by letter from the Sultan, and deals at the same time with the opinions related in it of the other court physicians, showing a perfect sense of true loyalty to his confrères. Whenever he refutes the opinion of other physicians, he gives an objective and purely scientific form of argument. The delicate position of a non-Muslim physician giving advice to a Muhammadan prince is evident from a passage at the end of this treatise : "May our Master not blame His humble servant because he prescribed in this discourse preparations of wine and the use of music which are abominated by the religious law. He does not p r e s c r i b e the use of these things, but he merely mentions and recommends all the things which are required by the medical art... Religion prescribes all that is useful in the next world; while the physician has to indicate what is useful and to warn against what is harmful in this world". So we see that MAIMONIDES had to use diplomatic terms in his prescriptions in order to avoid the rising of hostile feeling of the orthodox Muslims in the environment of the ruler.

The tenth of MAIMONIDES' medical writings was mentioned only cursorily by IBN ABĪ UṢAIBI'A, and I thought it apocryphal, until I was informed that there existed an old and good MS. of it in the Aya Sofya mosque library in Istanbul. I was able to examine it, and hope to finish editing it with a French translation and commentary during the course of this year (1937). The newly found MS. is called *Sharḥ Asmā' al-'Uqqār* (Commentary on the Names of Drugs"), a glossary of drug-names (47) on the lines of those of IBN JANĀḤ and IBN BIKLĀRISH. It was composed without doubt for pupils or beginners in medicine, and contains in many chapters the explanation of the names of 405 simple drugs. Those that occur are mostly Arabic, Greek and Persian names, but there are also many in the Berber and Mediaeval Spanish vernacular. It is a work of pharmacological philology, showing MAIMONIDES from a hitherto unknown aspect of his manifold activity. Strangely enough the great master does not give a single

(47) See M. MEYERHOF, *Sur un glossaire de matière médicale composé par* MAIMONIDE. In *Bull. de l'Institut d'Egypte*, vol. XVII (Cairo 1935) 223-35.

Hebrew name for any drug-names which, however, abound in his theological writings and commentaries. And this is all the more curious, inasmuch as his elder contemporary the Muslim prince and famous geographer MUḤAMMAD AL-IDRĪSĪ gave in his "Collection of Simple Drugs" which is still unedited (48), many Hebrew drug-names which he had learned probably from Jewish physicians in Spain and Sicily. I think that the absence of Hebrew names in MAIMONIDES' glossary is a proof that he composed this book mostly for the use of non-Jewish medical men. I add that the Istanbul MS. has been copied by the hand of IBN AL-BAIṬĀR, himself the most famous pharmacologist of the Islamic period.

To sum up, MAIMONIDES as a medical writer has created a series of useful books, mostly for educational purposes. He reveals himself, in another rôle too, as a mediator between the sciences of different nations, a rôle generally assumed by the Jewish physicians of the Middle Ages. But his medical writings are not of the same overwhelming importance as his theological and philosophical output. On the contrary, we must suppose that it was his personality as a consulting physician which has been a very imposing one, towering far above that of his colleagues. This explains the far-spread reputation of MAIMONIDES during his lifetime and after, in the Orient and in the Occident. Still at the end of the XVIth century we find him quoted in Latin medical books of the West in the words : *Dixit Rabbi Moyses.*

We have to continue the enumeration of MAIMONIDES' Jewish medical contemporaries who were — so many as are mentioned by IBN ABĪ UṢAIBI'A — partly court-physicians. Such is the case of ABU'L-MA'ĀLĪ TAMMĀM B. HIBAT-ALLĀH (49) who served SALADIN and his brother the sultan SAIF AD-DĪN. He is probably identical with MAIMONIDES' brother-in-law and the father of YŪSUF B. 'ABDALLĀH who edited the last chapter of his uncle's *Aphorisms* as preserved in the Gotha MS. (50)

There is a short mention of ABU'L-BARAKĀT AL-QUḌĀ'Ī (died

(48) See M. MEYERHOF, *Ueber die Pharmakologie und Botanik des arabischen Geographen* EDRISI. In *Archiv f. Gesch. d. Math., d. Naturwiss. u.d. Technik*, vol. XII (1930) 45-53, 225-36.

(49) IAU II 117; STEINSCHN. Ar. Lit. No. 155.

(50) See I. PAGEL, MAIMUNI *als medizinischer Schriftsteller*. In MOSES BEN MAIMON. Frankfurt a. M. 1908, vol. 131-47; D. KAUFMANN, *Un neveu de* MAIMONIDE. In *Revue des Études Juives* III (1883) 150 foll.

in 1199) (51) and ABU'L-BARAKĀT B. SHA'YĀ (52). The first named was physician in ordinary to Saladin's son 'UTHMĀN.

A little younger was AS'AD AD-DĪN B. YA'QŪB, a native of Maḥalla al-Kubrā (53) a town in lower Egypt in which lived and still lives an important Jewish colony. He studied in Cairo, passed some time about 1200 A.D. in Damascus where he had intercourses with the famous physicians of that period and settled down in Cairo where he won a great reputation as a practitioner. He also wrote on optical questions, on the principles of medical treatment, on the climate of Damascus as compared with that of Cairo, and a scientific correspondence with ṢADAQA B. AL-MUNAJJĀ, a Jewish (Samaritan) practitioner of Damascus whom we shall mention hereafter. As far as I know, nothing of these writings has been preserved.

At the same time of which I speak there lived in Aleppo a Jewish doctor named SUKRA (54) who won the favour of the great Turkish sultan NŪR AD-DĪN MAḤMŪD B. ZANGĪ (1146-73) by the successful treatment of his favourite female slave. His son 'AFĪF (55) was equally a distinguished practitioner in Aleppo. He composed in 1189 a treatise on colic which he dedicated to SALADIN.

To the next generation belongs the son of MAIMONIDES : ABRAHAM (56) was a physician to SALADIN's nephew, the Sultan AL-KĀMIL, his father's successor as court-physician and from 1205 onwards *nāqid* of the Cairo Jewish community. He was well acquainted with Greek philosophy and medicine, without reaching the outstanding scientific level of his father. IBN ABĪ UṢAIBI'A was his colleague at the hospital of the Cairo castle, from 1234-35. He describes ABRAHAM in the following words : "I found him an elderly man of high stature, of lean body, gentle manners and agreeable conversation, distinguished in medecine". ABRAHAM died some years after this date, probably in 1237.

MAIMONIDES' favourite disciple JOSEPH BEN YEHŪDĀ, known as

(51) IAU II 117.
(52) IAU II 118.
(53) IAU II 118; STEINSCHN. Ar. Lit. No. 163.
(54) IAU II 163 foll.
(55) IAU II 164; STEINSCHN. Ar. Lit. No. 152.
(56) IAU II 118; STEINSCHN. Ar. Lit. No. 159; SARTON, Introduction II 376.

IBN 'AQNĪN or 'AKNĪN (57), born in Ceuta (Morocco), took lessons from the master in Fusṭāṭ (in astronomy, theology, philosophy and medicine), moved to Syria and 'Irāq and settled down in Aleppo. There he became the chief physician at the court of the sultan AẒ-ẒĀHIR GHĀZĪ (one of SALADIN's sons) and the intimate friend of the aforementioned vizier and historian of learned men, JAMĀL AD-DĪN B. AL-QIFṬĪ. He died in 1226 A.D. YEHŪDĀ AL-ḤARĪZĪ praised him as a poet and sage. He wrote mostly on philosophy, and several of his works have been printed in Hebrew (e.g. *A treatise as to Necessary Existence* etc., edited by J. L. MAGNES, Berlin 1904). Concerning medicine, on which subject he gave lectures, he wrote on diet and a commentary on HIPPOCRATES' Aphorisms.

At the time when MAIMONIDES was living in Morocco in 1160, there was born in Cairo a certain DAVID BEN SHELŌMŌ, better known under his Arabic name AS-SADĪD IBN ABI'L-BAYĀN (58). He passed his long life of nearly eighty years in Cairo where he studied medicine under the guidance of IBN JUMAI' and the oculist IBN AN-NĀQID (both mentioned before). He was appointed to the Nāṣirī-Hospital which had been founded by SALADIN in 1181. He became later on Chief or President of the physicians in Egypt. IBN ABĪ UṢAIBI'A who worked at this hospital as an oculist under his orders, praises highly the intimate knowledge of this Jewish physician in the composition of remedies and his zeal in the treatment of sufferers. IBN ABI'L-BAYĀN composed a treatise called *Ad-Dustūr al-Bīmāristānī* ("The Hospital Canon"), a pharmacopoeia containing all the remedies in use in the hospitals of Egypt, Palestine, Syria, 'Irāq and in the drug-stores of the Near East. IBN ABĪ UṢAIBI'A helped the author to correct the book. It had a great reputation and exists in many manuscript copies. Its Arabic text has been recently edited by Father PAUL SBATH (Cairo 1933) (59).

The most prominent Jewish physician after MAIMONIDES

(57) IAU II 213; IQ 392-4; J. MUNK, *Notice sur* JOSEPH BEN IEHOUDA, in *Journal Asiatique* XIV (1842) 6-72; STEINSCHN. Ar. Lit. No. 170.

(58) IAU II 118 foll.; STEINSCHN. Ar. Lit. No. 154.

(59) PAUL SBATH, *Ad-Dastūr al-Bīmāristānī; le formulaire des hôpitaux d'*IBN ABIL BAYAN *médecin du Bimaristan Annacery au Caire au XIII^e siècle.* In *Bull. de l'Institut d'Égypte*, vol. XV (1933) 13-78.

seems to have been ʿIMRĀN B. ṢADAQA (60), doubtlessly identical with MŌSHĒ BEN ṢEDĀQĀ who is highly praised in the poems of YEHŪDĀ ḤARĪZĪ and MŌSHĒ DARʿĪ. He was born in Damascus in 1165 and was the son of a reputed Jewish physician. He studied medicine under RAḌĪ AD-DĪN AR-RAḤBĪ who was a famous physician and teacher, forming numerous medical disciples. The most prominent of these was ʿABD AR-RAḤĪM AD-DAKHWĀR, comrade and, later on, colleague of ʿIMRĀN. Contrary to the habit of the famous doctors of his time, ʿIMRĀN refused to enter the service of the many sultans and princes who offered him posts as court-physician. He was very much esteemed by his contemporaries who gave him the honorific name of *Awḥad ad-Dīn* ("Unique of the Religion"). He was then appointed to the great Nūrī-Hospital in Damascus which had been founded in 1154 by the sultan NŪR AD-DĪN MAḤMŪD B. ZANGĪ, the most formidable enemy of the Crusaders before SALADIN. IBN ABĪ UṢAIBIʿA gave a very vivid picture of the service in this hospital about 1220-30 when he was himself a young assistant ophthalmic surgeon. He witnessed the harmonious collaboration of the then very old AR-RAḤBĪ and his two pupils, AD-DAKHWĀR and ʿIMRĀN AL-ISRĀʾĪLĪ. The first named was in charge of the polyclinic service for outpatients. Of the other two, the Muslim and the Jew, IBN ABĪ UṢAIBIʿA speaks in enthusiastic terms : « From their collaboration sprang every advantage, and for the treatment of the patients the greatest profit. I exercised myself under their supervision in the medical routine, and I saw especially the physician ʿImrān accomplish really marvellous things concerning treatment and diagnosis of diseases." He then relates several serious cases given up by other doctors and cured by the great Jewish practitioner. He says that he mentioned many more such cases in his "Book of Experiences" which is unhappily lost. At another place IBN ABĪ UṢAIBIʿA sums up the memories of his time at the NŪRĪ-Hospital in a verse : "Then passed away those years and those men, and they are to me like beautiful dreams." He says, moreover, that ʿIMRĀN had a large income which he partly used to collect a great library of medical and other manuscripts. He died in 1239 at the court of the sultan

(60) IAU II 213 foll.

of Ḥimṣ (Emessa) where he had been called for a consultation.

An important part in the medical life of Syria and Palestine was played during the same period (XIIth and XIIIth century A.D.) by Samaritan physicians. The earliest known of these, only briefly mentioned by IBN ABĪ UṢAIBI'A, must have been a contemporary of MAIMONIDES, IBRĀHĪM B. FARAJ B. MĀRŪTH (61), bearing the honorific title of *Shams al-Ḥukamā* ("Sun of Learned Men"). He was one of the court physicians to sultan SALADIN and gave medical lectures to doctors and students of both countries.

One of the most conspicuous amongst the Samaritan physicians was ṢADAQA B. MUNAJJĀ (62), born in Damascus where he studied medicine and lived for a long time. He became later on the physician of the Aiyubid Sultan AL-ASHRAF MŪSĀ in 'Irāq where he died after 1223 A.D. IBN ABĪ UṢAIBI'A quotes Arabic poems composed by ṢADAQA. He wrote several medical treatises (e.g. on the names of drugs and a commentary on HIPPOCRATES' Aphorisms), clinical notes and answers to questions by the aforementioned Egyptian Jewish physician As'AD AL-MAḤALLĪ. He is said to have written a commentary on the Pentateuch and a treatise on the soul. Nothing of this output has come down to us.

Another Samaritan contemporary of MAIMONIDES was MUHADHDHIB AD-DĪN YŪSUF B. ABĪ SA'ĪD B. KHALAF (63) who lived in Damascus, took lessons in medicine from the aforenamed Samaritan court physician IBRĀHĪM B. FARAJ and from Muslim teachers and won a great reputation by the successful treatment of a dysenteric patient of high rank, the sister of SALADIN and SAIF AD-DĪN. He then entered the service of 'IZZ AD-DĪN, Sultan or emir of Ba'lbakk, and after his death (1179) into that of his successor MAJD AD-DĪN BAHRĀMSHĀH, who liked him so much that he made him his councillor and afterwards his vizier. It is said, however, that YŪSUF abused his high position in order to enrich himself and to give many high posts to his Samaritan relatives and friends. At last he was denounced to the ruler, kept in prison and deprived of his fortune. He then returned to Damascus where IBN ABĪ UṢAIBI'A saw him and found him

(61) IAU II 233. STEINSCHN. Ar. Lit. Anhang III No. 7.
(62) IAU II 230-3. STEINSCHN. Ar. Lit. Anhang III No. 27.
(63) IAU II 233 foll. STEINSCHN. Ar. Lit. Anhang III No. 21.

an old man of good manners and great eloquence. YŪSUF died in this town in 1227 A.D.

IBRĀHĪM B. KHALAF (64), a Samaritan physician mentioned only once by IBN ABĪ UṢAIBI'A, may have been a relative of the aforementioned YŪSUF. He and the great 'IMRĀN B. ṢADAQA were the only non-Muslims who were admitted — after severe examinations — to the lectures of RAḌĪ AD-DĪN AR-RAḤBĪ.

A nephew of YŪSUF, ABU'L-ḤASAN B. GHAZĀL B. ABĪ SA'ĪD (65), was at first a court physician to the emir MAJD AD-DĪN at Ba'lbakk where he composed a book on medicine in 5 sections. Afterwards he was converted to the Islamic faith, went to Damascus and was appointed vizier by the Sultan of Damascus AṢ-ṢĀLIH ISMĀ'ĪL (in 1237). IBN ABĪ UṢAIBI'A was his pupil in medicine and dedicated to him his great *History of Physicians*. He says that ABU'L-ḤASAN was a protector of arts and sciences and that prosperity reigned under his administration. He was named by the honorific title *Amīn ad-Dawla* ("Trustee of the Government") and *Sharaf al-Milla* ("Honour of the Nation"). He was, however, not lucky as he was implicated in the internal struggles of the Aiyubid dynasty, sent as a prisoner to Cairo, and after his liberation, killed by the Mamluk rulers during the troubles following the downfall of the Aiyubids, in 1251 A.D.

A last Samaritan physican mentioned by IBN ABĪ UṢAIBI'A, at the end of his *History*, is MUWAFFAQ AD-DĪN YA'QŪB B. GHANĀ'IM (66) of Damascus. The historian thinks very highly of his medical qualities and enumerates his writings, mostly compilations from former commentaries on IBN SĪNĀ's *Qānūn*. He wrote, moreover, an introduction to Logic and Metaphysics. He died in 1282.

After this short survey of the Samaritan physicians we have to return to Egypt where several Jewish physicians distinguished themselves in the second half of the XIIIth century. We do not know anything about their life, because this period is no longer covered by the great Arabic historians of the sciences.

ABŪ MANṢŪR SULAIMĀN B. ḤAFFĀẒ was probably a Karaite, bearing the Hebrew name SHELŌMŌ HA-KŌHĒN (67). He wrote

(64) IAU II 193. STEINSCHN. Ar. Lit. Anhang III No. 15.
(65) IAU II 234-9. STEINSCHN. Ar.Lit. Anhang III No. 5.
(66) IAU 272-3. STEINSCHN. Ar.Lit. Anhang III No 4.

a "Book of Selections" (from IBN SĪNĀ's *Qānūn*). He is sometimes quoted by the next named physician.

This is ABU'L-MUNĀ B. ABĪ NAṢR B. ḤAFFĀẒ generally known as KŌHĒN AL-'AṬṬĀR ("the Druggist") (68). He composed in 1259 - 60 for his son an Arabic treatise on pharmacy entitled *Minhāj ad-Dukkān* ("Manual for the Dispensary") in 25 chapters, covering the preparation of all the then known remedies and giving advice to pharmacists for the collecting and preserving of drugs, and other general information. His work is based on former Arabic pharmacopoeias, e.g. the *Dustūr al-Bīmāristānī*. It had a great success, was several times printed in modern times and is still in the Near East the manual most in use with the Oriental bazaar-druggists.

AL-MUFAḌḌAL B. MĀJID, called IBN ABI'L-BISHR (69), is only known by ḤĀJJĪ KHALĪFA and by two MSS. in the Cairo Library. These contain a medical poem (*Urjūza fi't-Ṭibb*) which the author wrote in 1268. It is not very remarkable.

'IZZ AD-DAWLA SA'D B. MANṢŪR, called IBN KAMMŪNA (70) was a Jewish physician in Egypt who was converted to the Islamic religion about 1280 A.D. He composed several philosophical works and a book on eye-diseases which is sometimes quoted by the Egyptian oculist ṢADAQA ASH-SHĀDHILĪ (XIVth century).

A prominent Jewish physician in Cairo and a personal friend of the famous Muslim polyhistor KHALĪL B. AIBAK AṢ-ṢAFADĪ was AS-SADĪD AD-DUMYĀṬĪ (i.e. of Damietta) (71), who practised in Cairo where he had been the disciple of IBN AN-NAFĪS, a celebrated professor of medicine and philosophy. He was admitted to the intimacy of his teacher, as he relates that he once assisted during a whole night in IBN AN-NAFĪS' house at a discussion of this latter with the judge IBN WĀṢIL, another Muslim of high philosophical and literary education. AS-SADĪD was one of the court physicians of the Mamluk Sultan AN-NĀṢIR MUḤAMMAD; he enjoyed the special confidence of the chief of the court officials. He died in 1339 A.D.

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(67) HKh VI 164; STEINSCHN. Ar. Lit. No. 173.

(68) STEINSCHN. Ar. Lit. No. 176, and ZDMG LVI (1902) 77-85.

(69) HKh VI 380; STEINSCHN. Ar. Lit. No. 177.

(70) STEINSCHN. Ar. Lit. No. 178.

(71) B.R. SANGUINETTI, *Notices biographiques sur quelques médecins tirées d'un ouvrage arabe d'*ASSAFADY. In *Journal Asiatique* 1857 No. 6.

Another Jewish physician of the second half of this century is known by his commentary on a well-known treatise on medicine ("The Book of the Hundred Chapters"). His name is NU'MĀN B. ABI'R-RIḌĀ' B. SĀLIM B. ISḤĀQ (72). He lived probably in Syria and was the teacher of the Muslim oculist ṢALĀḤ AD-DĪN B. YŪSUF at ḤAMĀ. Nothing more is known about him.

In the course of the XIVth century however, the domination of Mamluks and Mongols, and the more frequent attacks by Turks together with the ravages of the great plague (Black Death) brought a deep unrest into the world of the Near East, and an economic decay with its usual consequence, religious persecution. We meet more and more Jewish physicians who changed their faith in order to escape death or economic ruin. Many, however, remained faithful to their religion, but a decline in the position of Jewish practitioners is evident.

We must mention here the fate of a Jewish physician of Baghdad who attained high rank during the reign of ARGHŪN the Mongol Il-Khān (ruler) of Persia, (1284-91). He is known only under his honorific title *Sa'd ad-Dawla* ("Good Luck of the Government") (73). He gained the esteem of that prince not alone by his knowledge of the Mongol and Turkish languages, but also by the skillful manner in which he replenished the treasury of that avaricious ruler. He was then entrusted with the financial control of the whole kingdom. He promoted arts and sciences, but was accused by his adversaries of hating Islam and of giving lucrative positions in the Government service to his correligionists. One of those specially singled out for favouring was an oculist KHWĀJA NAJĪB. At last ARGHŪN fell ill, and the art of his physician and financial adviser was not able to save him. A few days before his death SA'D AD-DAWLA was imprisoned and put to death by his enemies, and his demise was followed by a general persecution of the Jews in Baghdad who were plundered and in many cases slain.

Other Jewish physicians are known only by their works. So I shall mention one 'ABD AD-DĀ'IM B. 'ABD AL-'AZĪZ (YEKUTIEL BEN USSIEL HA-DAYYĀN) of Bīra in Mesopotamia (74), who composed a treatise on Physics and Metaphysics.

(72) STEINSCHN. Ar. Lit. No. 189.
(73) *Encyclopaedia of Islam* Art. *Arghūn* vol. I (1913) 430.
(74) STEINSCHN. Ar. Lit. No. 187.

In the XVth century we can find still some names of Jewish medical men, but few of them in prominent position. In Cairo, about 1434, we have SHEMŪ'ĒL B. SHELŌMŌ HA-MA'ARABĪ (75) who composed treatises on religious themes which were commented upon by another Jewish physician SAMUEL B. SA'DŪN. Several medical practitioners in the Yemen followed his example and composed religious treatises. The most conspicuous amongst them is ABŪ ZAKARIYYĀ' YAḤYĀ B. SULAIMĀN ADH-DHIMĀRĪ (76) who lived about 1430. A physician named IBN AL-'AFĪF was appointed, after his conversion to Islam, chief physician of the Qālāūn-Hospital in Cairo (77). In 1438, however, he was cruelly executed together with a Jewish court physician KHIḌR, because the two doctors were unable to cure the disease of the Mamluk Sultan BARSBĀY. Another Jewish physician of the same period, AL-'AFĪF B. ABĪ SA'ĪD AS-SĀWĪ, is mentioned in a MS. at the Library of the al-Azhar-Mosque in Cairo as chief physician of Egypt and author of a book *Kitāb al-Lamḥa fi'ṭ-Ṭibb* ("Book of the Glance on Medicine") (77 *a*).

The list of medical Jewish practitioners and men of science of the Middle Ages in the Near East is still longer. But I must conclude here, and omit, to my great regret, many other interesting particulars of conditions then prevailing which would form an excellent subject-matter for research. So for instance, the relations of the physicians of the East with their colleagues in the Arabic-speaking West of the Islamic world; their relations to other Jewish and non-Jewish learned men with whom they came in touch. And last but not least their activity as translators of scientific and religious works from one language into another. Jews were at any period of their history very gifted in languages, and polyglot physicians abound in our list. Besides ḤASDĀY IBN SHAPRŪṬ in Spain (who knew Arabic, Hebrew, Latin, Spanish and probably Berber) and who translated the names of the drugs found in the Greek *Materia Medica* into Arabic, we can enumerate many dozens of such scholars. To the Jewish race belongs —

(75) STEINSCHN. Hebr. Uebers. 947; Ar. Lit. No. 199.

(76) STEINSCHN. Ar. Lit. No. 198.

(77) Ch. BACHATLY, *Une ordonnance médicale d'un traité perdu d'*IBN EL-'AFĪF. In *Bull. de l'Instit. d'Égypte*, vol. XVI (1932) 63-8.

(77a) H Kh V 329.

although he was a Christian theologian — the famous Syriac historian, grammarian, philosopher, physician, astronomer, man of letters ABU'L-FARAJ GREGORIUS. He is better known as BARHEBRAEUS (78), so called because he was the son of a Jewish physician AARON who had adopted Christianity. He wrote in Syriac and Arabic, but translated from many other languages. He must have known Greek, Latin, Armenian, Turkish, Mongol and perhaps the dialects of the vast regions from Syria to Adharbaijān and Persia, where he died in 1286 A. D. In spite of his father's apostasy, BARHEBRAEUS is a typical Jewish savant at the end of the period where Jews were still allowed to play an important part in the intellectual life of the East.

In general, the position of Jewish doctors was always better than that of their other correligionists, because their medical help was often needed by kings, princes and influential statesmen. This allowed them, not only to create a position for themselves, but also to attenuate the destiny of the Jews of their communities. Very often persecution has been averted or stopped by the intercession of Jewish court physicians. On the other hand, they met often the enmity and jealousy of their colleagues, and they had even serious difficulties to accomplish their medical studies. These were in olden times limited to the reading of the Greek and Arabic authorities in the presence of an experienced physician who explained the texts, and then to a practical stage, in a hospital or private consultation. We read very frequently in the chronicles records about the refusal of Christian teachers to give instruction or to admit to their hospitals, Jewish students, and contrariwise Muslim teachers refusing to admit Jews or Christians. Very often the Jewish student paved his way to success by superior intelligence, by extraordinary diligence and perseverance, forcing the admiration and even the friendship of reluctant Muslim professors.

The accomplishments of Jewish physicians in the Near East during the Middle Ages are not confined to the art of healing and to the production of scientific works, but they also assumed the rôle of carriers and mediators between Eastern and Western

(78) Art. BARHEBRAEUS in *Encyclopaedia of Islam*, vol. I (1913) 657 foll.; SARTON Introduction II 975-9.

science. Judaism has always been proud of this part, and I end my lecture with the hope that the Medical Faculty and the Hebrew University will continue to work on the lines of our ancestors, in order to help to create unity of science and unity of human thought.

(*Cairo*). MAX MEYERHOF.

Notes and Correspondence

Query 73. The tradition of Zenodoros.—The second section of BRADWARDINE's *Geometria speculativa* (c. 1335) devoted to isoperimetric figures, is probably derived from ZENODOROS (though no source is mentioned). Discussing the subject, MORITZ CANTOR remarked (*Vorlesungen*, vol. 2, 2nd ed., p. 116, 1899): "Es kann kaum einem Zweifel unterworfen sein, dass BRADWARDINUS diese Sätze dem Buche des ZENODORUS entnahm, welches jedenfalls in's Arabische und aus letzterer Sprache in's Lateinische übersetzt dem XIV. Jahrhunderte wohl bekannt war." This assertion is unsupported by any evidence either given by CANTOR himself, or known to me otherwise. I may recall that the original work of ZENODOROS (*περὶ ἰσομέτρων σχημάτων*) is lost, but its substance has come down to us through PAPPOS' own developments in Book V of his Collection and through the Commentary of THEON OF ALEXANDRIA on book I of the Almagest. These two texts can easily be compared by means of FRIEDRICH HULTSCH's edition of PAPPOS, *Pappi Alexandrini Collectiones quae supersunt* (vol. 1, p. 305 ff., Berlin 1876), including in appendix a Latin translation of THEON's commentary, *Zenodori commentarius de figuris isometris cum Pappi libro V collatus* (vol. 3, 1189-1211). See also PAUL VER EECKE's French translation of PAPPOS (vol. 1, 237 ff., Bruxelles 1933; *Isis* 26, 495), and canon A. ROME: THÉON D'ALEXANDRIE, *Commentaire sur les livres 1 et 2 de l'Almageste* (p. 355 ff., Città del Vaticano 1936). Apropos of this I may remark that my note on ZENODOROS (*Introduction* 1, 182) was placed a little imprudently in the first half of the second century B. C. I remarked "He flourished after 200 B. C. and before 90 A. D. but probably not long after the former date." According to canon ROME the uncertainty is even greater; all we can say with confidence of him (as well as of HERO OF ALEXANDRIA) is that he was posterior to ARCHIMEDES and anterior to PAPPOS.

After THEON OF ALEXANDRIA (IV-2), the curtain falls, and there are no glimpses of isoperimetric problems in Arabic literature except in the *Rasâ'il ikhwân al-ṣafâ* (the Epistles of the Brethren of Purity, X-2; *Introduction* 1, 661).

CANTOR remarks that the Arabs must have been acquainted with

ZENODOROS' ideas because a Latin ms. of Basel (1) dealing with isoperimetric problems refers to ARCHIMEDES under the corrupt form Archimenides. This is really a little too thin! Moreover assuming that there is an Arabic source behind that Latin text, it does not follow that it is different from the *Rasâ'il* already mentioned.

I have never come across an Arabic or Hebrew translation of the ZENODOROS' text, either in the PAPPOS form or in the form given to it by THEON OF ALEXANDRIA. Nor have I yet heard of a Latin (mediaeval) translation, except possibly the one represented by the Basel ms., known to me only through CANTOR's brief reference to it.

There are glimpses of isoperimetry in the *Pratica geometriae* of LEONARDO OF PISA (dated 1220; *Intr.* 2, 611), in the *Geometria* of THOMAS BRADWARDINE, in ALBERT OF SAXONY, REGIOMONTANUS, and finally in the Basel ms. already referred to (CANTOR 2, 116, 144, 283). That is all.

In conclusion we know practically nothing about the Arabic or the mediaeval tradition of ZENODOROS, a tradition which would deserve to be carefully investigated. I would suggest that the problem raised by my query is only an example out of many. We are beginning to know pretty well the Arabic tradition of some of the Greek masterpieces—e.g., some of the works of HIPPOCRATES, ARISTOTLE, EUCLID, PTOLEMY, GALEN—but for most of them we have only brief and insufficient indications as tantalizing as wills-o'- the-wisp. This illustrates the amount of work in store for the students of Arabic science.

August 28, 1937. GEORGE SARTON.

Prehistoric arithmetic in Vestonice.—Dr. KARL ABSOLON continues his very remarkable excavations in Vestonice (Wisternitz) Moravia, Czechoslovakia. According to the account in the *Illustrated London News* of Oct. 2, 1937, last year's campaign was extremely successful, for it brought to light a sculptured ivory head of a woman (under 2in. high), the earliest human portrait by a palaeolithic artist, and gave definite proof that the hunter of the diluvial period was able to count. Says Dr. ABSALON: " An exceedingly valuable find was a radius of a young wolf, 18 cm. (about 7 in.) long, engraved with fifty-five deeply incised notches. First come twenty-five notches, more or less equal in length, in groups of five, followed by a single notch twice as long, which terminates the series; then, starting from the next notch, also twice as long, a new series runs up to thirty. We know several of these Diluvial objects

(1) *Vorlesungen*, vol. 1, third ed., 1907, 705-06. The ms. referred to is the collection F ii, 33 in the Stadtbibliothek of Basel.

with markings denoting the conception of five. This number corresponds to the five fingers on each hand, which Diluvial man constantly had before his eyes and which no doubt led him to think in terms of numbers. We have here direct proofs of reckoning by fossil man. An object of this kind which possesses even greater value is a stone slab with numerical signs, which will shortly be submitted to the judgment of experts. There is no doubt that Diluvial man preferred to use wooden sticks for counting, and only made use of bone by way of exception. Unfortunately, as we know, the wooden sticks have perished. It is probable that the Diluvial hunter wrote down thus the numbers of his 'bag.' In France, they call this the *bâton de numération*. We propose to submit these objects for discussion at this year's International Anthropological Congress in Bucharest." For the rest of the text and the excellent illustrations see the *I. L. N.* G. S.

Marco Antonio de Dominis (1560-1624).—To the second footnote in *Isis*, 26, 40 there might be added that a bibliography of DE DOMINIS' works is to be found in AUGUSTIN and ALOIS DE BACKER, *Bibliothèque des Écrivains de la Compagnie de Jésus*, Liége, 7 series, 1853-1861, V, 177 f. The biographical note preceding the bibliography is the same as that to be found in the *Biographie Universelle*, XI. There is a shorter notice in CAROLOS SOMMERVOGEL, *Bibliothèque de la Compagnie de Jésus*, 10 vols., Paris, 1890-1909, III, 129-130. In his bibliography SOMMERVOGEL, unlike DE BACKER, essays to list only those works of DE DOMINIS which he wrote whilst a Jesuit. DE DOMINIS entered the Society of Jesus in 1579, and left it in 1596. He was born in 1560 and not in 1566, as R. E. OCKENDEN is made to say in his excellent article in *Isis*, 26, 40-49, 40.

Toronto. W. BURKE-GAFFNEY, S. J.

Black's Simplification of Bergman's Chemical Symbols.—BERGMAN's Chemical Symbols described by him in his *De attractionibus electioniis*... Upsala, 1775 have already been the object of several valuable communications. (See, for example, the more or less recent work of CRAVEN and CRANSTON, *Symbols and Formulae in Chemistry*... London and Glasgow, 1928, pp. 13-17, who incorrectly wrote BERGMANN, an error also made by me, *Isis*, XVI, 1931, p. 446). However no reference is ever made to the interesting article "Über die kürzeste Bezeichnungsart der Körper und ihrer Veränderungen bey doppelten Verwandtschaften" by L. CRELL in his *Chemische Annalen*... 1795 Pt. I, pp. 346-349 in which he describes BLACK's simplification of BERGMAN's symbols then still in general use. It is not intended here to deal with these simplifications

at any length but only to draw attention to CRELL's paper for further reference by those interested in the subject.

The University, Bristol, England. M. NIERENSTEIN.

Comenius Society. — A Comenius Society has been formed at Cambridge by research students to discuss questions of the history of science. Such a society could hardly have chosen a more appropriate name than that of the great Czechoslovak educationalist and thinker of the seventeenth century who did so much towards the founding of scientific institutions and the spreading of encyclopaedic knowledge throughout Europe.

This has focussed attention once more on Dr. ROBERT FITZGIBBON YOUNG's exhaustive monograph, *Comenius in England* (Oxford University Press 1932) which has thrown fresh light on the important part played by COMENIUS (KOMENSKY) in the movement which led to the founding of the "Invisible College" in 1645 and which became the Royal Society in 1661.

Letters of Fielding H. Garrison.—The publication of a volume of selected letters of FIELDING H. GARRISON is being considered. It is felt that such a volume will not only be very welcome to the many friends of GARRISON but will constitute a real contribution to American literature. It will present to a larger public a brilliant writer who so far was known only to a limited group consisting mostly of medical men.

Mr. F. L. TIETSCH, who was a very intimate friend of GARRISON, will edit the volume. Mr. HENRY MENCKEN and Dr. HENRY E. SIGERIST will contribute forewords.

I wish to invite all the many correspondents of GARRISON to send their letters to the Institute of the History of Medicine, Johns Hopkins University, 1900 East Monument Street, Baltimore, Maryland. The letters will be copied in the Institute and the originals will be returned to their owners without delay. The copies will be preserved in the Institute to serve as materials for a future biography.

While GARRISON was very reserved in personal contacts, he was exuberant in his letters. His moods and whatever worried him found expression in letters. Letter-writing was his way to free himself from oppressing thoughts and he not seldom passed harsh judgements on matters and people. It is needless to say that the editor will proceed very carefully in selecting the letters or passages from letters to be published.

HENRY E. SIGERIST.

History of petroleum. — The Second World Petroleum Congress held at Paris from June 14 to June 20, 1937 was attended by the record number of 1400 oilmen and their families. Its work, the discussion and reading of many papers, was done by five sections. Amongst these sections the Economic Section deserves our special attention as its president Mr. MAURICE P. E. MERCIER conceived the happy idea to devote one morning session of it to "The archaeology and history of petroleum" and he succeeded in getting many prominent archaeologists to write their views on the subject and to attend the meeting. Thus a very spirited reading and presenting of the papers took place after Mr. JULES TOUTAIN had read his able general report. The general conclusion of this meeting was that the study of the history of petroleum would profit by the close cooperation of archaeologists and petroleum engineers. Also it would seem profitable to divide this long history in smaller periods each of which could form the special object to be studied by a small group of experts. Many questions such as nomenclature in Antiquity, Greek fire and petroleum, etc. would profit enormously by the division of labour. Amongst those who took part in the discussion were Dr. SPIELMANN, Dr. LAWRENCE LOCKHART, Mr. ANDRÉ SÉGUIN, Dr. CONTENEAU, Prof. HERZFELD, Prof. LABAT, and Prof. FOUCHER. Eleven papers were discussed. After the meeting it was agreed that Dr. LOCKHART would concentrate on Persian petroleum history, Mr. SÉGUIN on Greek fire problems, Dr. FORBES on petroleum in Antiquity, while each would consult expert archaeologists on his period. Cooperation is sought to investigate the history of petroleum in Europe (300-1860 A. D.), China and America, about which only little evidence has been published and studied.

R. J. FORBES

Unity Schools. Farnham meeting 1937.—The fourteenth session of the Unity Schools was held in Farnham Castle from May 28 to 31, 1937. Between thirty and forty persons were present and the method pursued was somewhat different from that of earlier meetings of the schools. The long popular lecture was almost entirely discarded and discussions were introduced by the best available expert present on each chosen aspect of the general question. This was at Farnham the "Relations of Philosophy and Science," and the audience consisted in about equal parts of men and women specially trained and interested on the two sides. Mr. MARVIN who opened the conference and generally acted as Chairman, took broadly the line that philosophy should be regarded as the underlying synthesis of science. Professor J. H. MUIRHEAD who was the doyen of the philosophers rather urged the claim

of philosophy as an independent discipline. Of the men of science, the physicists, especially C. H. DESCH and HERBERT DINGLE, treated of the new views of physics in their bearing on philosophic thought, while the biologists, especially REDCLIFFE SALAMAN, discussed the border line territory which is now being explored, especially in the viruses, between the domain of the living and the inanimate. There was also discussion of the so-called new ' positivist ' theory of science as expounded by WITTGENSTEIN and the Viennese school.

The lively interest and success of the gathering suggest a sequence of a similar kind, aiming at a synthesis of different lines of study, e.g., of social science and ethics, biology and sociology etc. Schools of somewhat similar scope are being started in other countries, e.g. in Poland, and are needed everywhere. F. S. MARVIN.

The Eighth International Congress of Historical Sciences will be held in Zurich, Switzerland, on August 28—September 4, 1938. It will be organized in fourteen sections, dealing with the various fields and periods of historical studies, including prehistory, science of antiquities, auxiliary sciences, numismatics, religious, legal, constitutional, economic, social, and military history, intellectual history and history of science, and historical methods. Two kinds of papers will be presented. Those of general interest, limited to about fifty in number, will be read at the large morning sessions, while those of more special interest, limited to about 150 in number, will be read at section sessions held in the afternoon. The organization of the Congress is in the hands of a committee of which Dr. GEORGE HOFFMANN, Susenbergstrasse 145, Zurich 7, Switzerland, is secretary, to whom all correspondence respecting the Congress or participation in it should be addressed. The membership fee has been set at 25 Swiss francs, but members of the families of participants as well as undergraduates may secure membership at a reduced fee of 12 Swiss francs.

For the list of the seven previous congresses (1900 to 1933) see SARTON's *Study of the history of science* (Harvard Press 1936, p. 69).

Personalia.—(News pertinent to this section should be sent directly to Mr. L. GUINET, 11, Place général Meiser, Brussels, Belgium.)

On July 12, 1937, Dr. GEORGE SARTON was elected a corresponding member of the " Société des amis de l'histoire des sciences " of Paris. On October 1 of the same year he was elected a member of the Society for the study of alchemy and early chemistry, in London.

Reviews

Andreae Vesalii bruxellensis *Icones anatomicae*, ediderunt Academia medicinae novaeboracensis et Bibliotheca universitatis monacensis. New York Academy of Medicine, New York 1935 ($ 122.50).

This volume, a beautifully produced Double Crown Folio (38.2×54.5 cm.), consists of plates and figures for the most part reprinted from the original wood-blocks which were first used in the printing of the illustrations to ANDREAS VESALIUS' *De Humani Corporis Fabrica* published in Basel in 1543, and subsequently in the second edition published during the years 1552-55. In 1543 a number of these blocks as well as others were also used as illustrations to VESALIUS' *Suorum de Humani corporis fabrica librorum Epitome*, and to his *Von des menschen cörpers Anatomey*.

Published by The New York Academy of Medicine in association with the Library of the University of Munich the volume is made up of 95 plates comprising all the illustrations used in the writings of VESALIUS, making a total of 289 figures accompanied by 130 pages of legends (in the Latin of VESALIUS) explanatory of the figures. Of these 289 figures 227 were printed from the original blocks now in possession of the Library of the University of Munich, and an additional figure, the title-page of the second edition of the *Fabrica*, from the original wood-block in possession of the Library of the University of Louvain. The title-page of the first edition of the *Fabrica* is also reprinted from the original block. All these plates and figures were prepared by STEPHAN VAN CALCAR under the supervision of VESALIUS himself. By great good fortune it has been possible to reproduce in the present volume three little known sketches for the title-page of the first edition of the *Fabrica*, one of which is indisputably by VAN CALCAR, the other two being doubtfully so. Sixty-one of the missing figures have been reproduced in facsimile; these figures include, among others, the portrait of VESALIUS and the eight of the muscle figures in the second of the seven books, and also the figures on 39 of the small blocks belonging to the three works published in 1543.

Of the 10 small blocks, probably cut by the order of JOHANNES OPORINUS in 1555 at Basel for the second edition of the *Fabrica*, one alone is pre-

served in the Library of the University of Munich; the remainder, together with those of the ornamental initial letters of both editions are lost. It is not improbable that these became the property of the heirs of OPORINUS after his death in 1568.

The history of the wanderings of these blocks is of great interest. In a letter written by VESALIUS to OPORINUS, which is reprinted at the beginning of the present volume, VESALIUS states that he is forwarding the *Fabrica* and *Epitome* texts and blocks to him at Basel in the month of August, 1542.

The history of the blocks after 1543 is not yet clear, but it would appear probable that they remained at Basel at least until the end of 1555 when the second edition of the *Fabrica* was published. Actually the first word we have of the blocks after this date is from FELIX PLATTER who, in the Preface to the Third Book of his *De Corporis Humani Structura Et Usu*, (1583), states that they had been offered for sale at Basel some years previously. The next we hear of these blocks is in the beginning of the 18th century when they made their appearance at Augsburg, when ANDREAS MASCHENBAUER published some of them in an abridged edition in 1706 and again in 1723. In this connection it is of interest to note that VESALIUS may have been induced to promise his blocks, as soon as he had done with them, to someone in Augsburg.

About the year 1770 the physician VON WOLTTER conveyed the blocks to Ingolstadt, and in 1783 HEINRICH PALMAZ LEVELING used the blocks of the *Fabrica* and some from the *Epitome* in a work entitled *Anatomische Erklärung der Original von Figuren Andreas Vesal.* LEVELING, it would appear, assisted the University of Ingolstadt in acquiring the blocks for its Library. In 1800 the University Library together with the University was removed to Landshut, and again in 1826 to Munich, where in the University Library the blocks lay forgotten in boxes until 1893 when some of them were discovered by its distinguished Librarian Dr. HANS SCHNORR VON CAROLSFELD. The remainder of the blocks were not discovered until 1932 when Dr. SAMUEL LAMBERT, one of the editors of the present volume, acting upon the suggestion of the late LEONARD MACKAIL, consulting librarian to the New York Academy of Medicine, caused a search for them to be instituted in the Library of the University of Munich. It is to the original initiative of Dr. LAMBERT and of the Librarian of The New York Academy of Medicine, Dr. ARCHIBALD MALLOCH, that we owe the present volume.

The text of the *Fabrica* does not form part of this volume, and this is greatly to be regretted, for with very little extra expense the text could easily have been reprinted. The paper upon which the plates are printed is too white in contrast to the deep black ink which has been used in the

reprinting, and we suspect that it is of the kind which will begin to fox very shortly. It is to be hoped that this fear will prove groundless for the plates are actually better printed than they were in VESALIUS' works.

An English translation, carefully edited, of the *Fabrica* is greatly to be desired. Such a text together with the available original plates would, we venture to suggest, do more for the advancement of studies in the history of science than any similar production of which we can think. Such a task would be a full-time devotion lasting some years. Cannot some foundation be found to support it?

New York University. M. F. ASHLEY-MONTAGU

Franz Strunz.—THEOPHRASTUS PARACELSUS. *Idee und Problem seiner Weltanschauung.* 2. Auflage. Deutsche Geistesgeschichte in Einzeldarstellungen. Herausgeg. v. Doz. Dr. P. VIRGIL REDLICH. Vol. II, Salzburg und Leipzig. ANTON PUSTET, 1937. pp. 214. Oesterr. S. 9.

In five chapters the well-known historian of science and philosophy gives an expert outline of the chief ideas and problems of PARACELSUS, of his " Weltanschauung". In the first chapter, a biographical sketch, PARACELSUS already emerges as the scientific explorer, who becomes one of the great founders of science, because of his anti- " scientific " attitude. This, however, was directed against scholasticism which, at his time, was the paramount method in science and medicine, and for which he generally substituted his own and new experience. Nevertheless PARACELSUS appears as an exponent of mediaeval thinking, (Chapter 2) in that he is thoroughly influenced by his religious convictions from which he derives the conception of unity in the world. Religion, however, leads him back to science, since all secrets of nature (" arcana naturae ") are God's creation, " magnalia " of the Almighty which will be revealed by search in nature to the God-fearing alone. There is, in the world of PARACELSUS, much of the general tone of the " autumn of the middle ages." There is a yearning for " re-creation " of the world and mankind, the expectation of a fundamental change in the Christian world. The basis of the science of PARACELSUS (Chapter 3) is nature and working on it is " real and visible philosophy". With the aid of God, man, the peak of creation, can achieve everything, and in particular healing of disease, magic effects etc., and in research on nature the discovery of the *invisible* forces, the " semina " which are of real significance since they produce form, govern function, and give things their individual and generic peculiarity. The paramount method of detecting them, and thereby of achieving a knowledge of what is

" real " in nature, (as opposed to the pseudo-results of scholastic reasoning and formal logic) is " alchemy " (Chapter 4). This is far more than transmutation of metals. It is the universal science of nature, of life, evolution and motion in general, leading to an understanding of the way in which lower forms and stages develop into higher ones. " Non fui quod eram, nunc sum dum morior." There is no activity on the part of the research worker, the physician, mankind in general, which does not belong to " alchemy". It is the search for the order and plan which connects all the realms of nature.

STRUNZ shows how this concept of alchemy as universal science, introducing order and types into nature, becomes the basis of the doctrines of JOH. AMOS COMENIUS and his ideal of " pansophia". Such universal science is religion in that it embraces the *specific* qualities of beings as far as they are *created by God*, i. e. reality. Belief in Him is opposed to pseudo-knowledge which deals with the external appearance of things. Belief leads to the deeper sense of things, their specific essence, their reality. The physician, in restoring harmony between microcosm (man) and the outside world acts according to God's providence and will (Chapter 5). Just as science was considered to be a search for God in His creation, therapy and medical knowledge is God's gift, His blessing and miracle. Cure is the indication of God's presence, of his " epiphany", " ... PARACELSUS bekommt seinen Sinn durch den GLAUBEN. Wer an ihm vorbeisieht, wird seine Persönlichkeit nie und nimmer verstehen."

Ever since STRUNZ, in 1903, published his first editions and works, a vast PARACELSUS literature has appeared. There are several editions of the works of PARACELSUS but an appropriate account of his doctrines, a real understanding of his religious and at the same time scientific attitude has not hitherto been given.

PARACELSUS shares the same fate with other related thinkers (e. g. VAN HELMONT), in that he is either praised as a scientific explorer who was forced by the spirit of his age to conceal his achievements behind religious terminology and figures of speech, or as a deep religious and metaphysical thinker who did not materially contribute to the development of science. Obviously both points of view are incorrect. PARACELSUS as well as VAN HELMONT will not be understood unless the interdependance of their religious-metaphysical and scientific side is duly recognised. Strong motives towards scientific research are derived from religion, and these, as the reviewer endeavoured to show, underlie and penetrate the reformation in Biology and Pathology connected with the name of PARACELSUS and VAN HELMONT. (*Bulletin, Instit. Hist. Med., John Hopk. Univ.*, 1935, III, 97-312). Science in turn supports

PARACELSUS' religious view of the world. In the reviewer's opinion STRUNZ' book fills a real gap in the PARACELSUS literature in that he focusses attention on the point mentioned and explains the key figure of Renaissance science and medicine as an undivided personage and does justice to all sides of his activities. STRUNZ's book is very well produced and deserves close attention by everybody dealing with PARACELSUS and his period.

WALTER PAGEL.

Oosterhuis, R. A. B.—*Paracelsus en Hahnemann, een Renaissance der Geneeskunst*. Met een voorwoord van Prof. J. A. J. BARGE. Leiden. A. W. SIJTHOFF. 1937, IX+300 pp.

In rabbinic literature we find God praised, for He wounds and His hands heal. He substitutes healthy flesh for the purulent wound by means of the same knife.

In human beings wounds are inflicted with one knife and healed with another. Cure is made according to the principle prevailing in Greek medicine: *Contraria contrariis curantur*. God, however, wounds and heals with the same instrument, His will and grace; He cures after the principle: *Similia similibus curentur* (1). This is the well known homoeopathic concept in a definitely religious connexion. Although mentioned in antiquity, it had not much attention before PARACELSUS, the great opponent of ancient medicine, employed it. Was it his opposition to antiquity to which his inclination to homoeopathy was due, was he perhaps actuated by his deep religious convictions which

(1) The account of this for which I am greatly indebted to Mr. H. LOEWE Reader in Rabbinics, Cambridge University, may be given in full, because of the general interest the subject deserves. LOEWE draws my attention to an example from a homiletic compendium of exegetical material on the book of *Exodus*, called *Shemoth Rabba*, ch. XXVI, § 2; one of the authorities there mentioned is the great Rabbi *Me'ir*, who lived in the second century of this era. In *Exod.* XVII, 5, MOSES is told to take the rod with which he smote the Nile. MOSES said, "Sovereign of the Universe, that was the rod of punishment, which brought the plagues. How shall it now bring forth water for the thirsting people?" God said, "My nature is not as man's nature. A surgeon cuts with a knife (σμίλη, *izmil*) and heals with a plaster, but as for Me, with that very substance with which I smite, I heal." This thought remained current for long. It is repeated in a poem by SOLOMON B. JUDAH, the Babylonian (See DAVIDSON's *Thesaurus*, vol. I, p. 122, no. 2595: *Zulath* for Sabbath *Bereshith*) who lived in the Xth-XIth centuries.

It may be remarked that the *Misnah* prohibits a man bitten by a mad dog from eating the lobe of its liver since that was regarded by the Sages as sheer superstition. MATTHEW BEN HERESH allowed this probably on empirical grounds. Other cases of "*similia similibus curantur*" are known.

had so much influence on his trends of thought and medicine? Information on these points would be obviously a great help for the understanding of PARACELSUS as well as of the history of important medical conceptions. The present book provides the material for an answer to the above questions as it gives on pp. 109-206 a compilation of and a commentary on all the passages from P's. writings dealing with the Similia-Similibus-principle in therapy. It appears that PARACELSUS' concept of Sympathy and Antipathy, his conviction that there must be remedies in nature specific for each disease and similar considerations rather than immediate religious motives, are responsible for the favour given to homoeopathy. In addition the empirical observation that remedies might produce disease when used in exceeding quantities and that small doses of toxic substances create immunity against them, have probably supported the homoeopathic view. A " Simile " in PARACELSUS' sense is e.g. a plant in which the pathogenic irritant is present and fulfils a certain function in its normal life. If this plant is introduced into the body, the irritant in it might combine with the identical pathogenic agent in the body and prevent its further nocuous action. Only a " Simile " will combine with the pathogenic agent and by " sympathy " eliminate it from the body or lead a process back into the normal course after it had taken a pathological one. The name, type, nature and course of a disease are identical with name, structure and function of the remedy. The physician must know the properties of arsenic in order to cure an " arsenic "-disease, i. e. one that is caused by arsenic or by what corresponds in man as " microcosm " to the arsenic in the outside world, the " macrocosm ".

The book contains more than a survey of these and similar homoeopathic concepts found in P's. writings. The author compares them with those of HAHNEMANN who was the first to give a real homoeopathic *system* and to stress the minute dosages. Yet there is hardly any concept found in the doctrine of the latter which was not fully realised by PARACELSUS, e. g. the paramount importance of the remedy (" Arzenei ") in medicine which is superior to dietetic prescriptions and must be studied by means of the doctor's own experience. In some points P. is definitely superior to H., e. g. in recognising the healing power of nature and the necessity of adapting the cure to the constitution of the individual. It is possible to follow up how the homoeopathic concept develops in the later writings of PARACELSUS, whereas he is not so definite about it in his earlier works. Moreover, he gradually substitutes the morphological point of view in determining " Similia " by dynamic and functional principles. Yet, PARACELSUS did not arrive at the subtle symptomatology which was later built up by HAHNEMANN. The author shows that P. maintained

the doctrine of the so-called " Signatures", but not in the superficial sense which is usually connected with it. It is not the outside appearance or colour of a plant which gives its indication in disease (e. g. the yellow colour of Chelidon in diseases of the liver). Rather its " Anatomei " i. e. its internal structure which produces its virtue decides the indication.

Space does not permit further detail to be given of the book which is indeed full of new material interesting to the Historian of Medicine and of Human Culture and which, utilising the scientific literature draws a vivid picture of PARACELSUS and hitherto not fully known aspects of his cultural background (e. g. the influence of the " devotio moderna " at Deventer and Zwolle on PARACELSUS). The author himself seems to adhere to the homoeopathic doctrine and a good deal of his book is devoted to the merits of HAHNEMANN and his modern followers. This, however, does not concern the historical side of the book and its considerable value for the historian which alone can be the subject of the present review. Yet, it is only fair to add that concepts very similar to homoeopathy are essential elements in PAPACELSUS' medicine and that homoeopathic doctors and thinkers—the name of the late EMIL SCHLEGLE must be mentioned in this connexion—have substantially contributed to the present high appreciation and new understanding of PARACELSUS.

WALTER PAGEL.

Charles Monroe Coffin — *John Donne and the New Philosophy*. ix + 311 pag. New York, Columbia University Press, 1937, ($3.50).

Professor COFFIN has written a book which will surely establish itself as the standard authority on the relation between JOHN DONNE's (1572-1631) scientific reading and the influences of that reading upon his poetry. Anyone who has but once savoured of DONNE's poetry, or even of his sermons, cannot have failed to have been impressed by the celestial imagery which characterizes so much of his writing. In the present book Professor COFFIN traces practically every such image in the poems to its source, and thereby enables us to judge both DONNE's poetry and DONNE's always acknowledged erudition more completely than has hitherto been possible. Professor COFFIN's acquaintance with the "new philosophical" avenues of DONNE's approaches leaves nothing to be desired, and his exposition of a subject in itself attractive is rendered doubly so by writing which is unusually distinguished.

Like PETRARCH before him, DONNE stood with one foot in the old and with the other in the new world. As Professor COFFIN puts it "He represents the effort of the late Renaissance mind to make an ad-

justment to its world of changing values without sacrificing its regard for the equal claims of emotion and reason."

DONNE has frequently been referred to as the last of the great disciples of scholasticism, the last of the mediaevalists, the last follower of those dark esoteric beliefs that the "new philosophy" was to "call in doubt." Professor COFFIN's examination of DONNE's poetry shows, however, that DONNE imbibed more deeply of the "new philosophy", as he called the new science of the beginning seventeenth century, than had hitherto been suspected. It is now quite clear that not only was DONNE familiar with the writings of COPERNICUS, TYCHO BRAHE, KEPLER, GILBERT, and GALILEO, in an age of traditionally orthodox Ptolemaic astronomy, but that his familiarity with these discoverers' works was of a deeply interested scholarly nature. By 1608, for example, DONNE has already read and studied KEPLER's *De Stella Nova*, a work first published two years earlier in 1606; GALILEO's *Siderius Nuncius* published in 1610 is referred to, and it is quite clear that it had already been read, by DONNE in 1611. Thus, it appears, that DONNE made a real endeavour not only to read but to keep abreast of the writings of the "new philosophers".

Though the "new philosophy" made a great contribution to the range of DONNE's poetic imagination, his thought, as Professor COFFIN is aware, "is hung on the framework of the old Ptolemaic world," where "it hangs loosely, with an ill-fitting awkwardness of which he himself is too well aware. Though the physical point of reference in the poems, as far as the cosmic structure is concerned, may be taken to be the 'solid Earth' the true point of reference is to be sought in the poet's mind, a mind already aware that the traditional sun and the earth are 'lost' and, therefore, eager to establish another, more permanent and satisfying."

By a peculiar coincidence with the completion of the last paragraph the reviewer took up his copy of the newly arrived issue of *The Times Literary Supplement* (London) for July 3rd 1937 and there on page 492 * found an article entitled *John Donne the Astronomer*, by I. SHAPIRO. Mr. SHAPIRO, who is one of our best authorities on DONNE, is apparently quite unaware of Professor COFFIN's book, and his last paragraph is therefore all the more interesting. He writes :

"We must not regard DONNE as medievally minded because he allowed the objections of contemporary science and 'common sense' to outweigh the inspired conviction of scientists, right indeed, but unable as yet to prove that faith they held was the only true one. On the other hand we must not represent him as in the van of 'advanced' opinion, like GIORDANO BRUNO. DONNE is ready to examine the claims of contemporary science,

(*) See also *ibidem*, July 17, p. 528.

and to accept what it can prove, but no more. Even that places him ahead of most of his contemporaries."

These conclusions are in complete agreement with those arrived at by Professor COFFIN in his book, though he has not cared to put them so explicitly in a work which is concerned with the poet's imaginative response to the "new philosophy" alone, and not with his acceptance or denial of that "new philosophy".

Independence and openness of mind was always a characteristic of DONNE, and that he did not attach himself to any particular author or school but remained broadly tolerant of all, constitutes an additional proof of his unique quality. But DONNE is too complex a character for him ever to serve as an example of the mind transitional between the old and the new world. Not that he is as inscrutable a figure as some have attempted to make out, but because of his too scrutable and unique complexity is he debarred from any consideration in a larger extension than that of JOHN DONNE himself. In the history of science or of humanism DONNE holds no formal place, unless it be that of a rarely intelligent and sensitive onlooker. n the history of literature his influence as a writer has yet properly to be evaluated, as a poet he stands alone, *nonpareil*, and in his book Professor COFFIN has made a notable contribution towards an understanding of DONNE's splendid isolation.

New York University. M. F. ASHLEY-MONTAGU

Ernest Campbell Mossner. — *Bishop Butler and the Age of Reason* : A Study in the History of Thought. New York : The MACMILLAN Company, 1936. ($2.50).

In the introduction to this book the author tells us that the reasons for the historical decay of Deism are still not sufficiently comprehended; perhaps the "not sufficiently" holds at the conclusion. The volume gives us a copious and careful review, more particularly of the "voluminous minor literature" of the period, which is to re-create for us a "mental current" that rose in Cartesian rationalism and debouched in the scepticism of HUME. The main interest throughout lies in the bearing of the conception of Reason, in its multifarious disguises, upon religious thought. BUTLER's works are made the center of the scheme, and one of the chief points is thus the outcome of the Deistic controversy. This, it appears, instead of being a victory for the "abstract rationalism" of Deism, or for the rationally argued Christian faith of BUTLER, was scepticism.

The first two chapters are a rapid survey of seventeenth and early eighteenth century rationalistic doctrines, mainly as embodied in Deism

and thus as opposed to traditional Christianity. There follow fifty pages of summary exposition of BUTLER's *Analogy* and his Rolls Chapel Sermons. The remaining chapters sketch the Decline and Fall of Reason, with the rise of the Wesleyan movement on the one hand and the critical scepticism of HUME on the other. The book concludes with chapters on BUTLER's reputation and a brief estimate of his significance for the history of thought in England.

Much as one must respect the documented erudition, the author's patient and extensive reading in some of the dullest of English writers, the drastic criticism of BUTLER's several particular arguments, along with the scholarly calm that still admires his "really big mind" aud his "genuine constructive work" in ethical theory, one is left with the ungracious feeling that the author might have profited by a reminder from HOBBES. Without great passion, though a man may be free of giving offense, he can not possibly have either a great Fancy or much Judgment. Lacking passion, as professional etiquette requires, and hence lacking any very fresh news of BUTLER or of the Age of Reason, Mr. MOSSNER's book is likely to serve mainly to demonstrate his own competence and control of the material covered. His work is typical of the best of what in universities is called producing. He does show that LESLIE STEPHEN was not justified in denying that BUTLER enjoyed the full recognition of his contemporaries, and he does sketch many of the ramifications and reversals in the conception of Reason. But his method is too often the mere summary outline of the pages of his reading, whether in BUTLER or in other authors; and his account of BUTLER's reputation consists largely in citing passages in which BUTLER is mentioned. This is indeed evidence that BUTLER *had* a reputation, but a reader could not be blamed, I think, for asking what actual influence BUTLER's thinking exerted upon men's minds or for caring little about the bare fact that the Bishop was reputed to have such an influence.

I hope that it is not mere impertinence in a reviewer to wish that the author had penetrated a little deeper into the current that he was "re-creating" for us and had found in that thought itself the clearest reason for the decay of Deism. Deism and rationalism failed for the same reason that BUTLER's *Analogy* failed. They were not knowledge of the world but putative logical demonstrations or analogical deductions of actualities. And as we all now know, no actuality of anything, natural or divine, is susceptible of logical demonstration. Men made words, after all, to express and communicate experience and knowledge. The Christian religion had the same natural sources for its myths as other religions. It could hardly fail to reveal "analogies" to nature, since the elements, as well as the relations combining them, in any religious con-

struction, necessarily come from men's own experience in nature. It was not required of Mr. MOSSNER to say this; but, obvious as the statement is, it suggests why BUTLER's *Analogy* and even his ethical theory are dust in our mouths, and this account of them rather an academic exercise than a book. For Reason the case is scarcely better. Reason is a principle of order; it is not a distinct power, but the satisfaction of a desire for the clarity and comprehension that give control and freedom of the mind. Its seventeenth and eighteenth century advocates wished it to furnish content, to make up the substance of the knowledge to which it can only give articulate form. Naturally, then, either they fell into the obvious contradiction of making it irrational by the surreptitious introduction of empirical content, or they consistently kept it pure — and empty of meaning. Deism was a religious form of the rationalism that either dissolved God into the very structure and substance of the world, as in SPINOZA, or removed God from the scene of nature. It then characterized him, as NEWTON did, in terms the only possible meanings of which were those natural attributes from which the attributes of God were held to differ so completely that, as NEWTON put it, they remain "utterly unknown to us".

Mr. MOSSNER's book does not penetrate much below the surface arguments of his texts. The result is that the old issues retain much their original confusion and their somewhat specious subtlety and complexity — for which, after HOBBES and SPINOZA, there was in all conscience little enough excuse. So much may be taken as praiseworthy historical concreteness. But an immersion so near the surface is of dubious efficacy; at any rate it leaves the book in that class of publications that is rather to be checked off for academic credit than read for intrinsic quality or point. Full credit the most grudging reader will grant — for careful and extensive scholarship and for cautious, uncolored judgment. But having done the drudgery, Mr. MOSSNER was in a position to do more for us. His book is a little disappointing, its whole quality symbolized, perhaps, in its not infrequent lapses into the flattened, unnerved English that we are becoming inured to in current works of scholarship. The breath of life does not come full and free under the academic force-pump, even though the pump has not yet quite produced a perfect vacuum.

(Harvard University). D. W. PRALL

D. M. Low.—EDWARD GIBBON, 1737-1794. xiv+370 p., New York: Randon House, 1937 ($3.50).

In 1929 Mr. LOW published the journal which GIBBON kept up to the year 1763 (*Gibbon's Journal*, London), thus putting all students of

GIBBON deeply into his debt. Not the least valuable portion of that work was the able introduction and the valuable notes contributed by the editor. It was then evident that if we were to have a biography of the author of *The Decline and Fall of the Roman Empire*, we could not hope for a better biographer than the editor of *Gibbon's Journal*. And here it is, a laurel to celebrate the bicentenary of GIBBON's birth. Mr. LOW has achieved a book which is at once a work of art and of critical scholarship, which the general reader and the student alike may, with equal profit and pleasure, enjoy. While a welcome number of GIBBON's letters here for the first time make their appearance, Mr. LOW's biography is by no means burdensomely detailed, and, as one would expect from so knowledgeable a student of GIBBON, and so able a writer, Mr. LOW carries his knowledge and his reader lightly with him. In an age of careless writing Mr. LOW's style deserves more than a passing comment. In the best sense modern, Mr. LOW has an unusually nice sense of the value of words, and his ability in the use of them calls for admiration. It is a beautifully efficient, remarkably fine, and economic style; one which would have pleased the fathers of the Royal Society, who were so anxious that their correspondents write both efficiently and economically, as it must please every modern reader. It is a rare pleasure to read such good writing, and it is good to be able to think that the book is not a tome because of it. And it is good to have this particular biography of GIBBON, than which one can hardly expect to see a better in our day.

Whatever may be written of the fussy great little man (he was fat, fussy, flirtatious, but not formidable, and almost always acted as if he were fifty and famous), *The Decline and Fall of the Roman Empire* is his book, an enduring monument erected by himself, almost consciously to himself, which will ensure his lasting fame and honour, until the ultimate man of taste and reason be left. How long before that time? GIBBON, giving his customary raps upon his huge snuff-box would, pointing his finger like a calamus, refer you to *The Decline*.

The portraits of GIBBON are excellently reproduced, and there is a good index.

New York University. M. F. ASHLEY-MONTAGU.

Ernest Gray (Editor).—*The Diary of a Surgeon in the Year* 1751-1752, *by John Knyveton*. Pp. xiv+322, APPLETON-Century Co., 1937, ($ 2.50).

JOHN KNYVETON, the keeper of the diary, was born at Bromley, Kent, 16 September 1729; both his parents died while he was still a young child, and he was adopted by his paternal uncle, a surgeon residing

in the village of Hestley, Kent. A descendant of the uncle-surgeon presented the diary of JOHN KNYVETON to the present editor to whom all students of the period, and all lovers of a good story which is said also to be true, must be grateful for the present excerpt from that diary which deals only with the first year of the diarist's life as a student and surgeon's mate during the year from Sept. 1751 to Nov. 1752.

Following an apprenticeship of some years to his uncle, JOHN KNYVETON went up to London in the Autumn of 1751 and registered as a student at " Infirmary Hall." " The conditions at ' Infirmary Hall ' were those of every hospital at the time, but there are those ", writes the editor, " who might think the editor had some axe to grind of his own were he to allow the hospital to be named, this being an age of impudent literary allusions." (xii). In this connection we can only remark that while we appreciate Mr. GRAY's sensibility as an editor, we can hardly commend his totally unnecessary act in disguising the hospital with which JOHN KNYVETON was associated some 200 yeais ago. An editor may at most resume, he should never under any circumstances presume. In this connection Mr. GRAY appears to have gone even further and so to have " edited " the style of the diarist as to make him use words and phrases which did not come into existence until the 19th century. It is a great pity.

JOHN KNYVETON was a young man of excellent character, a very diligent student, a careful observer, a sincere diarist writing for the record and not for publication, and hence, a delight to read, but intellectually he was rather commonplace. He was a country-bred lad. After being in London for some five years he is still able to exclaim, after watching a ' flea-circus,' " This London be a marvellous place, where one may see more Wonders in ten yards than one would see in ten Miles at home ; the which is no doubt why the inhabitants are more hare-brained, constant Surprises shaking the Wits and enervating the Reason." (96). And yet, when KNYVETON retired from the Navy after some nine years of active service, he chose to settle in London, although it must be stated he had previously given the country a trial but without success.

His account of medical training and practice in a London hospital, of the teachers, the surgeons, and the physicians, of public executions, and resurrectionist activities, and of the life of a surgeon's mate in one of His Majesty's ships of the Line, render his diary not only interesting to the historian of the period, but alive and exciting to any class of reader and of any time. The account of Dr. JOHNSON's dinner to Mrs. LENNOX will greatly interest Johnsonians, but passages such as this are of more than passing interest :

" *Nov.* 27, 1751. To Mr. KELLY's again, having learnt that he would be at his rooms today. A very intriguing discourse on the structure of the Human Frame as revealed by the Microscope but could not understand the half of it. He did speak also of a Ladder of Nature, quoting one Baker, His *Microscope Made Easy*, of how the whole Chasm from a Plant to a Man, is filled up with divers kinds of creatures, rising one over another by such a gentle and easy ascent, that the little Transitions and Deviations from one Species to another are almost insensible to that the Scale of Life rising by degrees to such a one as Man we may equally suppose that it still proceeds upwards through numberless beings of an order superior to him to the Throne of the Father of all ; to the which idea I did take very kindly and was pleased for once to find Mr. KELLY's philosophy and mine so well agree ; having wondered a little whether his microscope may not a little have addled his wits so that he aproaches the unreasoning state of the savage." (42-3).

The pattern of JOHN KNYVETON's life during this one year recorded in his diary was variegated enough to last others a whole life-time. He died in 1809 ; now more than one hundred years after his death he comes to life again in a form which, we think, will assure him a new and longer lease of life. It is a grand book as a story, but owing to the Editor's methods, the book is rendered practically valueless from the viewpoint of the student.

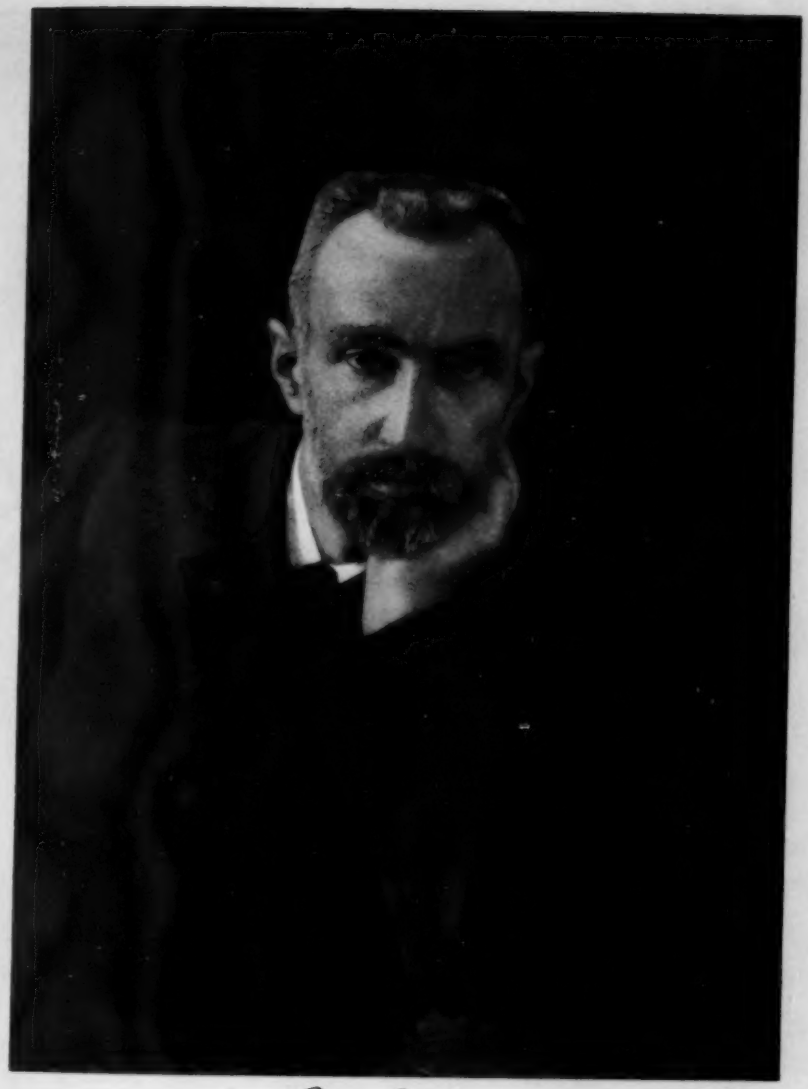
New York University. M. F. ASHLEY-MONTAGU.

Eve Curie.—*Madame Curie* (1867-1934). *A biography*. Translated by VINCENT SHEEAN. Illustrated. xi+393 p. Garden City, New York, DOUBLEDAY, DORAN, 1937 ($ 3.50).

Marie Curie.—*Pierre Curie* (1859-1906). Translated by CHARLOTTE and VERNON KELLOGG. With an introduction by Mrs. WILLIAM BROWN MELONEY and autobiographical notes by MARIE CURIE. Illustrated. 242 p. New York, MACMILLAN, 1932.

Claudius Regaud.—*Marie Sklodowska-Curie*, 1867-1934. 30 p., 2 illus. Paris, Fondation Curie, 1934.

The publication of Mlle CURIE's splendid biography of her mother brings back to our mind the almost incredible events which revolutionized scientific thought at the end of last century. First ROENTGEN's discovery of the x-rays at the very end of the year 1895 ; see my study *ad hoc* and the facsimile of his paper (*Isis* 26, 349-69, 1937) ; then in 1896, the discovery of uranic rays by HENRI BECQUEREL (1852-1908), finally the discovery of polonium announced by PIERRE and MARIE CURIE on July 18, 1898, and that of radium announced by them and their collaborator BÉMONT, on Dec. 26 of the same year. All of that in three



P. Curie
1859 - 1906

Isis, XXVIII (2), pl. 10. G. SARTON

MARIE CURIE
1867-1934

years! The sluices were now wide open and an endless series of other discoveries and inventions marked the rapid growth of radiology and radiotherapy, and transformed physics and chemistry down to their foundations. Indeed the minds of scientists had been so deeply impressed that most of them, at least the younger ones, had no great difficulty in accepting other startling innovations, such as the theories of quanta and of relativity, the ideas of isotopes and of the transmutation of elements.

The discovery of radium was unique not only in its importance, but also in its having been made by two scientists, man and wife, working so closely together that the share of each cannot be determined.

"We cannot and must not attempt to find out what should be credited to MARIE and what to PIERRE during these eight years (1). It would be exactly what the husband and wife did not want. The personal genius of PIERRE CURIE is known to us by the original work he had accomplished before this collaboration. His wife's genius appears to us in the first intuition of discovery, the brilliant start; and it was to reappear to us again, solitary, when MARIE CURIE the widow unflinchingly carried the weight of a new science and conducted it, through research, step by step, to its harmonious expansion. We therefore have formal proof that in the fusion of their two efforts, in this superior alliance of man and woman, the exchange was equal." (p. 159).

The conjuncture which brought together from two very distant points (Paris and Warsaw) these two individuals, as similar as they were rare, is truly miraculous. Though brought up far apart and in very different ways, they were as alike, with regard to essentials, as two individuals can possibly be. Their rationalism, their passionate love of truth and of science, their indifference to money and fame, their innate austerity were equally deep and genuine. Thus when she wrote the life of her husband in 1924 (2), it was easy for her to delineate his character, and she did it admirably. Her biography of him is a model of clearness and brevity, severely simple yet very moving for whoever can read between the lines.

"In our life together," does she say (p. 88), "it was given to me to know him as he had hoped I might, and to penetrate each day further into his thought. He was as much and much more than all I had dreamed at the time of our union. My admiration of his unusual qualities grew continually; he lived on a plane

(1) That is, from May or June 1898 to PIERRE's accidental death in 1906. MARIE survived PIERRE, and continued *their* work twenty-eight more years. (G. S.)

(2) M^me^ CURIE: PIERRE CURIE (112 p., PAYOT, Paris, 1924; *Isis* 7, 232). That is the book translated into English by the KELLOGGS (New York 1932); the translation includes autobiographical reminiscences of MARIE CURIE, which did not appear in the French book.

so rare and so elevated that he sometimes seemed to me a being unique in his freedom from all vanity and from the littlenesses that one discovers in oneself and in others, and which one judges with indulgence although aspiring to a more perfect ideal."

"I have attempted to evoke the image of a man who, inflexibly devoted to the service of his ideal, honored humanity by an existence lived in silence, in the simple grandeur of his genius and his character. He had the faith of those who open new ways. He knew that he had a high mission to fulfil and the mystic dream of his youth pushed him invincibly beyond the usual path of life into a way which he called anti-natural because it signified the renunciation of the pleasures of life. Nevertheless, he resolutely subordinated his thoughts and desires to this dream, adapting himself to it and identifying himself with it more and more completely. Believing only in the pacific might of science and of reason, he lived for the search of truth. Without prejudice or *parti pris*, he carried the same loyalty into his study of things that he used in his understanding of other men and of himself." (p. 143).

And to these judgments we may add that of HENRI POINCARÉ, as quoted in EVE CURIE's book (p. 251) (3):

"Who could have believed that so much gentleness concealed an uncompromising soul? He did not compromise with the generous principles upon which he had been nourished, or with the special moral ideal he had been taught to love, that ideal of absolute sincerity, too high, perhaps, for the world in which we live. He did not know the thousand little accommodations with which our weakness contents itself. He did not separate the cult of this ideal from that which he rendered to science, and he has shown us by a brilliant example what a high conception of duty can come out of the simple and pure love of truth. It matters little what god one believes in; it is the faith, and not the god, that makes miracles."

When the discovery of radium brought them sudden fame they were utterly unprepared for it, not only because of their deeprooted opinions and prejudices, and their need of time and solitude, but also because of their exhaustion. After the death of her husband in a stupid accident (April 19, 1906), MARIE remained a "pitiful and incurably lonely woman" and her distaste for fame and all the servitudes which it entails, her contempt for many of the social conventions which enslave so many men, increased to a dangerous point. Many French scientists disliked her; they said she was cold and dry (4). If we define a "good fellow," a man who shares not so much the convictions of his neighbours, as their attitudes, superstitions and prejudices, their likes and dislikes, and their vanities, a man who can laugh and gossip with them, then neither PIERRE nor MARIE were good fellows. It is true after the war

(3) For the original see POINCARÉ's *Savants et écrivains* (70, Paris, 1910).

(4) I am not inventing this. Statements to that effect have been made to me or in my presence by distinguished Frenchmen.

some happy holidays with her children and friends in Larcouëst (5) and in Cavalaire brought her a new serenity and renewed joys such as she had experienced as a child in rural Poland, or as a young wife cycling with her husband across France. Yet even then the excessive work of thirty years began to tell on her strong organism, which had been insidiously weakened by accumulated radiations. Thus when her soul was ready again to enjoy life, or at least readier, her body broke down. Her visits to Sweden and America, however pleasant, were too much for her remaining strength.

In her autobiographical notes, she concluded :

> " Humanity certainly needs practical men, who get the most out of their work, and, without forgetting the general good, safeguard their own interests. But humanity also needs dreamers, for whom the disinterested development of an enterprise is so captivating that it becomes impossible for them to devote their care to their own material profit. Without the slightest doubt, these dreamers do not deserve wealth, because they do not desire it. Even so, a well-organized society should assure to such workers the efficient means of accomplishing their task, in a life freed from material care and freely consecrated to research." (p. 336). (6)

Mme CURIE left two daughters, the elder of whom, IRENE, followed in her parents, footsteps, and has already secured her own fame together with her husband FREDERIC JOLIOT (they obtained a Nobel prize together in 1935, this being the third Nobel prize in the CURIE family) (7) ; the younger, EVE, a pianist and musical critic, has now established her own survival by means of this biography. Indeed it is excellent ; it is beautifully written and contains the precious information which only one who actually shared MARIE's life could have given, yet it is restrained and sufficiently objective. It is a biography rather than a scientific study of her parents' achievements and of their repercussions, but that can be found elsewhere. For a brief but clear account of MARIE SKLODOWSKA-CURIE's work I recommend the notice written by Dr. CLAUDIUS REGAUD, who was her main collaborator on the medical side.

Thanks to EVE CURIE's book it is possible to realize that her father and mother were not only great scientists but very great individuals, whose moral stature is comparable to that of FARADAY and DARWIN. Men combining intellectual power with moral nobility to such a degree are

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(5) An unknown and unspoiled place in Brittany, which had been discovered in 1895 by the historian CHARLES SEIGNOBOS and the biologist LOUIS LAPICQUE.

(6) I quote the SHEEAN translation rather than the KELLOGGS' (p. 227 of their book).

(7) MARY ELVIRA WEEKS : M. and M^me^ JOLIOT-CURIE (Kansas City, 1936; *Isis* 26, 534).

exceedingly rare, and their lives should be read in the same spirit as people read the lives of the saints. I will expect my Harvard and Radcliffe students to read and ruminate the lives of PIERRE and MARIE CURIE; it may awaken in them, if it be there, the love of truth and the love of science.

Note on the two portraits published with this review. The portrait of PIERRE CURIE represents him at the very end of his life, at the age of 46 or 47. It was the portrait which his wife liked best and which she caused to appear as frontispiece to the "Œuvres de PIERRE CURIE," published in 1908 (Paris, GAUTHIER-VILLARS, xxii+622 p.) by the "Société française de physique," with a very beautiful preface written by herself.

The portrait of Mme CURIE was received by me in 1924; hence it represents her at the age of 57 or younger. GEORGE SARTON.

Louis-Ferdinand Céline. — *Mea Culpa & The Life and Work of Semmelweis.* xxiv + 175 pag. Translated from the French with an Introduction by ROBERT ALLERTON PARKER, Boston: LITTLE, BROWN & Co., 1937, ($ 2.00).

The present volume consists of two distinct works, the first is devoted to a typically Célinese indictment of the human spirit in some 6700 words with particular reference to the U.S.S.R. where the author recently visited; the second part of the volume is devoted to *The Life and Work of Ignaz Semmelweis* (1818-1865), being the author's thesis as presented for the Doctorat en Médecine to the Faculty of Medicine of the University of Rennes, and accepted and awarded the gold medal by that faculty in 1924.

The author of these two writings is one of the most remarkable figures of our day. His *Voyage au bout de la nuit*, published in Paris in 1932, created a rare sensation in the literary world. His recent *Mort à crédit* has entrenched his reputation as one of the most sensationally interesting writers of our time. CÉLINE's object is to shock. In this he succeeds so well that some have not hesitated to call him mad. CÉLINE himself has stated that the combined effects of head shrapnel and shell-shock have left him with a neurosis; but mad? 'Mad' is one of those epithets which persons of limited imagination have always been pleased to hurl at the heads of those for whose work they have had an irrational objection. If CÉLINE be mad it were well for the world if it had a few more such madmen.

To the humanist CÉLINE's view of human nature is most interesting; his craftsmanship in presenting that view may be admired or not, but no one could leave his work without feeling something of its effectiveness.

This is, however, not the place to consider CÉLINE's purely literary qualities; we are here interested in his reactions as a result of his visit to the U.S.S.R. and the homily on human nature which pours like a torrent from him, and in his *Life of Semmelweis* which constitutes but a further and earlier homily upon the same subject.

Like another great French contemporary literary figure, ANDRÉ GIDE, CÉLINE came away from the U.S.S.R. not only greatly disappointed but also completely disillusioned. Others have undergone the same experience before him. Still others who have been either enemies of, or unsympathetic towards, the Soviets have returned to the U.S.S.R. and, like Sir BERNARD PARES, have left greatly admiring, or like Prince MIRSKY have been converted and remained. The vast numbers of opinions which have been expressed by responsible and irresponsible writers on the U.S.S.R. has naturally resulted in producing a state of mind in most thinking individuals akin to one of 'no-information' at all concerning the real conditions at present prevailing in the U.S.S.R. CÉLINE's article, unlike the monumental work of the WEBBS, is not full of facts, in fact there is only one reference to a direct observation in which the author, an experienced physician, in speaking of the hospitals states that "with the exception of the fine one of the Kremlin and the Intourist wards and rooms, the rest are openly sordid" (p.31), yet, somehow, in his strange translated-from-the-Paris-argot style, CÉLINE very cogently manages to convey the truth that all is not well in the U.S.S.R. CÉLINE's view of the U.S.S.R., as well as of human nature, is summed up in the following passage :

" ...Injustice is once more entrenched under a new banner, much more horrible than the former, because it is even more anonymous, water-tight, perfected, intractable, supported by thousands of dicks who are expert in treachery. To cook up apologies for the whole of this filthy mess, the whole gigantic breakdown, there is no dearth of explanations... The Russians are unequaled at chewing the rag. Except that there is one avowal that is never permitted, one pill that they can never swallow; that is that Man himself is the worst of all breeds... He himself manufactures his own torture, in no matter what circumstances, just as syphilis creates its own lesions... There is the real mechanism of it all, the ignominy of the system." (P. 32).

But the essence of CÉLINE's view of human nature is expressed upon an earlier page :

"The great pretension to happiness, that's the main big fraud; that's what complicates all living ! That's what makes people so poisonous, so filthy, so hard to take ! There is no happiness in this existence of ours, there are only misfortunes, larger or smaller, coming sooner or later, breaking out or secret, delayed or driven underground. "The surest to be dammed are those who

think themselves happy." This principle of the devil still holds good. He was right as always in fixing Man's interest on Matter. Results have not been delayed. Within two centuries, mad with his own importance, puffed up by his own mechanics, he has made himself impossible. So we see him to-day, haggard, soaked, drunk on alcohol, defiant, pretentious, defying the universe with his split seconds! Dizzy, lacking all moderation, incurable, he is a cross between sheep and bull, with a strain of hyena thrown in... " (p. 21).

In this passage CÉLINE declares himself a Jansenist, though it is greatly to be doubted whether he has ever in the slightest been influenced by Jansenism in any form; again and again CÉLINE points his vitriolic finger at man's depravity, his rottenness, his bestial nature, his confusion and his anarchy. As Mr. PARKER, who has done an excellent job as translator, writes in his introduction :

"He attacks our unconscious complacency; he undermines our tacit assumptions; he defies our most cherished taboos; he makes us revise our moral values. It would be dishonest to deny that he is an anarchist — but his whole work is one long, sustained protest against that anarchy, that lawlessness into which the whole world finds itself plunged to-day. CÉLINE rejects the superficial remedies, the noisy external revolutions, the shouting and the tumult. Because all that he writes is rooted in his own tragic experience, because he has lived these things, vitality and integrity pulsate through every word he utters."

And it is for these reasons that CÉLINE is eminently worth reading and reflecting upon.

In keeping with the philosophy of *Mea Culpa* and also with the philosophy and the style of his novels is CÉLINE's study of SEMMELWEIS. It is wonderful to think that a University Faculty awarded this medical thesis a gold medal, for the thesis is most unconventional both in style and in the manner in which the author treats his subject. We cannot imagine any but a French Faculty even accepting such a brilliantly done piece of work, — it is a tribute to the intelligence and good taste of CÉLINE's examiners at the University of Rennes that they should have selected CÉLINE's thesis for special distinction.

SEMMELWEIS is for CÉLINE one of those self-abnegating benefactors of the human race who are perhaps its only hope for the future, and in his account of the life and work of SEMMELWEIS the author burningly pillories the motives and the conduct of such human beings as were responsible for the tragedy not alone of SEMMELWEIS' life but of countless thousands of women who died in the forty years during which these human beings kept the one discovery that could have saved them consciously from them. (In *Mea Culpa* CÉLINE writes of 'human beings' thus, "Man is, after all, 'human' just about as much as a chicken is a flier. When a hen gets a good swift kick in the tail, or when a motor

car sets her to waltzing, she can sometimes make it about as high as a roof, but flops right back down into the mud, to resume pecking at the dung. That's her nature and her ambition. For the rest of us, in human society, it is exactly the same. We can cease being completely swinish only when some catastrophe strikes us. When the emergency passes, the natural comes galloping back..." (p. 33).

The story of SEMMELWEIS' discovery of the means of preventing puerperal fever has often been told, and never more effectively than by CÉLINE, though his study does not give one the kind of information, nor as exhaustively, that one expects from a more formal study. CÉLINE's treatment of SEMMELWEIS is something in the manner of LYTTON STRACHEY, though CÉLINE adheres more strictly to facts than STRACHEY ever attempted to do.

If anyone, reading the tragic story of SEMMELWEIS, for a moment thinks that the bigots, the mediocrities, the sycophants, and the disinterested great men of the order of TILANUS, SCHMITT, SEYFERT, DUBOIS, VIRCHOW, and SIMPSON, or the tolerance of the learned societies of the order of the Paris Academy of Medicine, or the Medical Society of London, are factors no longer to be reckoned with in the modern academic world, let such a one step out into the world, and he will learn that young men still suffer from the intolerance, the jealousy, the bigotry, and the little-spiritedness of mediocre masters, who contrive to keep them down by a variety of methods which need not here be discussed, and from academies which refuse publication to monographs which are challenging either of the vested interests or the intellects of those determining the policies of the academies. It is a sad reflection upon human nature and hence, CÉLINE's preoccupation with it and with SEMMELWEIS. Yes, Truth prevails in the end despite the barking of the dogs of St. ERNULPHUS, but at what a cost !

New York University. M. F. ASHLEY-MONTAGU

J. J. Thomson. — *Recollections and Reflections.* xiii + 451 pag. New York, The MACMILLAN Co., 1936, ($ 4.00).

One of the most charmingly written and most interesting books we remember to have read for a long time this is not a conventional autobiography, but rather a testament of experience in which the author has almost succeeded in doing less than justice to himself. In fact, we do not know of a work in this *genre* in which the artist has contrived so gracefully to keep himself in the background of a canvas of which he is the chief subject. Yet we manage to learn quite a great deal not alone of Sir J. J. THOMSON's career and achievements — of which he says as little as he can except in the formal exposition of the discoveries with which

he has been associated — but also of his personality, and this we learn not so much from what little he tells us about himself as from so much that he tells us of others. In short, this is a very noble book by one of the noblest minds that has ever adorned the field of science.

The admirably done sketches which Sir J. J. THOMSON gives of his teachers, his contemporaries, and a select gathering of others, are an extremely valuable part of this book, which will for this, among other reasons, be a happy hunting ground for future historians of physics. Sixty years at Cambridge, the making of the Cavendish Laboratory the world's most famous centre for physical research, the discovery of the electron — among other things — all these are things which have made Sir J. J. THOMSON's name known to every educated man in the Western Hemisphere. The account which the author gives of his discovery of the electron is extraordinarily illuminating and of great importance to the student of physical discovery; the further accounts which Sir J. J. THOMSON gives of his own and of the work of others are also very illuminating. The whole book is an illumination of a life, a mind, a personality, a period, and a subject. Like all the author's work this book is already a classic.

New York University. M. F. ASHLEY-MONTAGU

Y. P. Frolov.—*Pavlov and his School.* Pag. xix+291. London: KEGAN PAUL, 1937, (12 s. 6d.).

Though many biographical details are scattered through the pages of this book, it is not a 'Life' or even a general biographical account of IVAN PETROVICH PAVLOV (1849-1936); it is, rather, an excellently clear brief exposition of the origin, development, and achievement of PAVLOV and his school in the special realm of the physiology of the nervous system. As such it will be found invaluable by a very large class of readers. Much of the material in the book will be new to many readers; for example, PAVLOV's critical analysis of certain of the doctrines of psycho-analysis, which, by the way, is by no means unfavourable to some of the fundamental of those doctrines; equally interesting is PAVLOV's analysis and demonstration of the inadequacy of the supports of KRETSCHMER's body-mind typology. The following passage ought to be reprinted as a leaflet and sent to every psychological and psychiatric laboratory in the world: "PAVLOV... expressed himself against compressing all the wealth and variety of physiological types encountered in actual life into the Procrustean bed of KRETSCHMER's classification, which is based on far from complete clinical data that are inevitably restricted by the narrow bounds of place, time and biological and social conditions under which clinical investigations are

usually conducted." (210). At least, this passage ought to be written into every copy of KRETSCHMER available, for, in a nutshell, it puts the defect of that brilliant worker's classification of constitutional types.

It is extremely interesting to learn that it was the reading of G. H. LEWES' *Physiology of Common Life* (here re-translated from the Russian as *Practical Physiology*) at the age of fifteen which determined PAVLOV to become a physiologist. LEWES' book always remained the most treasured volume in PAVLOV's library. What a tribute to LEWES! How happy would LEWES have been to know of the influence his *Physiology* exerted upon the history of physiology, for we may be sure that others besides PAVLOV were influenced in the same direction by a reading of that splendid book. Whilst on the subject of LEWES it requires to be added that no thorough biographical study of that remarkable man exists in any language. There is Miss ANNA KITCHEL's charming *George Lewes and George Eliot* (New York, 1931), but that, as the author puts it, is rather a record of records than a biography. What a marvellous opportunity beckons here!

New York University. M. F. ASHLEY-MONTAGU.

August Forel (1848-1931).—*Out of My Life and Work.*—Pag. 352, New York: W. W. NORTON & Co., Inc., 1937, ($ 3.75).

AUGUST FOREL's life was vastly more interesting and fruitful than this, his autobiography, would lead one to believe. The fact is that the autobiography is a disappointment. It was written after the decline of FOREL's powers, following a series of strokes, and this, without a doubt, accounts for the rather dry and sometimes dulling narrative of facts. FOREL was entirely aware of his condition when writing the book, and characteristically shares the awareness with the reader. He says what he best remembers as well as he is able, and the editor does the rest. Naturally, all admirers of FOREL will want to read and own the book. FOREL's name is perhaps best known in connection with his most popular book *The Sexual Question*, which is still a steady seller. This book created something of a sensation when it was published and produced a great effect in many quarters and upon many minds. I was naturally interested to learn how the book came to be written, and in the story of the events following the publication; but not only are the details not given, but the book is itself referred to on two occasions only, and then only in an aside.

The best thing in the book is FOREL's Testament which he wrote in 1928, and which was read, as intended by the writer, by his son during the cremation of FOREL's body at Lausanne July 29, 1931.

Apart from the great social reforms with which he was identified,

FOREL was responsible for devising the first workable microtome with a hollow-ground blade, and claimed to have been the originator of the neuron theory. His early work on the anatomy of the brain, his studies in general neurology and psychology, in hypnotism and suggestion, in myrmecology, and his splendid work in the organisation of the alcoholic abstinence movement (The International Order of Good Templars), and in paving the way for the organisation of the League of Nations, are achievements which will assure his name a lasting fame, for those achievements are among the foundation stones of the Twentieth Century, and above them is the spirit of AUGUST FOREL.

New York University. M. F. ASHLEY-MONTAGU.

Mathematische Keilschrift-Texte herausgegeben von O. NEUGEBAUER. — Erster Teil, *Texte*, royal 8vo, 1935; Zweiter Teil *Register, Glossar, Nachträge, Tafeln*, mit 10 Textfiguren und 69 Tafeln, 4to, 1935; Dritter Teil, *Ergänzungsheft*, mit einer Textfigur und 6 Tafeln, 4to, 1937. Berlin, SPRINGER, xii, 516 p.; iv + 66 p. + plates; viii + 86 p. + plates.

This very extraordinary work lists every known mathematical text, and dates, and transcribes and translates and interprets, all those necessary for getting a comprehensive idea of the mathematical achievements of the Sumerians, Akkadians and Babylonians, in the light of most recent discoveries. The three volumes form three parts of Band 3, of *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik, Abteilung A, Quellen*. The texts date from 2500 to 200 B. C. while the work of many other scholars in the field has been important, credit for a very large part of the final results is due to the discoveries of NEUGEBAUER during the past decade. In recent years F. THUREAU-DANGIN, a learned editor of *Revue d'Assyriologie et d'Archéologie Orientale*, has also published notable material in connection with mathematical texts.

An article surveying many results in Babylonian mathematics, including some set forth in the first two parts of *Mathematische Keilschrift-Texte* (MKT), has been already published in *Isis* (v. 26, Dec. 1936). MKT III contains complete discussions (p. 1-48) of eleven texts, two in the British Museum and nine in the Yale Collection. Eight of the latter are series-texts and had already received tentative treatment in MKT I and II. New material on table-texts on pages 49-51 is followed (p. 52-66, 73-75) by very valuable "Nachträge und Berichtigungen zu MKT I and II." Chapter V is devoted to a glossary of Akkadian words, and of idiograms and Sumerian words, in MKT III as well as to corrections of a similar glossary in the first two parts. Chapter VI (p. 76-80)

is a "Rückblick". NEUGEBAUER finds in Greek mathematics many influences of Babylonian work, and also remarkable underlying methods and theory which arise also in astronomical texts.

As an example of the valuable new material in Chapter IV we may recall the problem in the Louvre tablet (A06770) of about 2000 B. C. (MKT II, p. 40-41), to find how long it would take for a sum of money to double itself at compound interest, interest being computed at 20 % per annum. The problem is, then, to find x in the exponential equation

$$(1 + 0;\ 20)^x = 2.$$

The correct result is approximately 3; 48 years; but it was at first believed that the text gave as an answer $x = 4 - 0;2,23,20 = 3;57,26,40$ years. MKT III shows, however, that the text arrives at an accurate result. The reasoning may have been as follows: $1;12^3 < 2 < 1;12^4$. Hence the portion of a year which must be subtracted from 4 to give the correct result would be

$$\frac{1;\ 12^4 - 2}{1;\ 12^4 - 1;\ 12^3} = 0;\ 12,46,40.$$

But the number of months in this portion of a year would be got by multiplying 0;12,46,40 by 12, which gives 2;33,20 months. Hence the error in the first interpretation of the problem was in assuming 0;2,23,20 to be a portion of a year, instead of 2;33,20 as the number of months, to be subtracted from 4 to give the correct answer. This accurate solution of an exponential equation four thousand years ago is surely very extraordinary.

No earnest student of ancient mathematics can afford to be unfamiliar with the material in these remarkable volumes of NEUGEBAUER. Scholars will eagerly await his volumes dealing with Babylonian astronomy, that they may not only have the complete picture of Babylonian mathematics, but also see more clearly what Greek indebtedness to this mathematics may have been. In certain directions it would seem to have been not inconsiderable.

R. C. ARCHIBALD

William Arthur Heidel. — *The Frame of the Ancient Greek Maps*, 141 pp. American Geographical Society, New York, 1937.

This book discusses the margins of Greek maps, which represented the outer regions of the known world. Early geography was chiefly empirical and covered only a small portion of the earth's surface. The margins of the maps then coincided even in theory with the limits of travel and commerce. But when this primitive geography was con-

fronted with the theoretical postulates of the spherical earth, there arose one of the most striking problems in the history of science. Never, perhaps, has empirical knowledge been more belittled by theoretical. The old maps were shown to cover a mere patch on the surface of the whole earth, and subsequent classical geographers grappled helplessly with this gap in their knowledge. In accordance with this schism between the old and the new geography of the ancients, the present work is divided into two parts dealing respectively with the empirical geography of the flat disk and the theoretical geography of the sphere.

The former part has to do chiefly with the Ionians : ANAXIMANDER, ANAXIMENES, HECATAEUS and HERODOTUS. The discussion of these is somewhat vague and uncritical, because it treats Ionian cosmology and cartography as static sciences. The nebulous phrases, "old Ionian maps" and "the Ionian map" are used freely, and unsubstantial agreements between scattered data are frequently emphasized. The Ionian ἱστορίη, however, was free and critical above all else; HERODOTUS attacked the opinions of HECATAEUS (1), and HECATAEUS those of his predecessors. This discussion draws no distinctions and thus gives a false impression of unanimity.

The theoretical frame given to "the Ionian map" is erroneous also. It is based on EPHORUS, frag. 30 (38), and HERODOTUS II 24-27, and both of these data are misinterpreted. EPHORUS divides the horizon into four sections by the four solstitial points and locates the Aethiopians, Indians, Scythians, and Celts along the margin in each section. The manuscripts of COSMAS INDICOPLEUSTES, who is one of the authors to attest this fragment (2), diagram these statements by means of a rectangle with the solstitial points at the corners. Professor HEIDEL ascribes this rectangle to Ionian maps and calls its sides parallels and meridians. The diagram, however, is characteristic of the manuscripts of COSMAS, which have many illustrations; and it is doubtful whether it has any ulterior source. HERODOTUS says that the Nile shrinks in winter because the sun is then blown (*sic*) southward towards its headwaters and dries them up, and that it would do the same for the Ister if the sky were turned around. Professor HEIDEL deduces that on Ionian maps the Nile and the Ister were equidistant from the equator and lay along the summer and winter tropics, which he identifies with the sides of COSMAS' rectangle. This is confusing solstice and equinox with tropic and equator (3).

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(1) See the recent article by KURT VON FRITZ, "Herodotus and Greek Historiography", *Trans. Am. Philol. Assoc.* LXVII (1936), 315-340.

(2) Cf. POSIDONIUS fr. 100 (87) in PLINY, *Nat. Hist.* VI 57, 197.

(3) The same confusion occurs in ERATOSTHENES' criticism of DEIMACHUS'

The former, *τροπαί* and *ἰσημερίαι*, appear in Ionian geography as fixed points on the horizon of the flat earth. The latter, *τροπικός* and *ἰσημερινός*, are circles described by the sun on the celestial sphere at the times of the solstices and equinox and, secondarily, the projection of these circles on the terrestrial sphere. They postulate the sphericity of the earth and are thus foreign to Ionian cosmology. It is an anachronism to apply them to Ionian geography.

The second part of the book treats the geography of the sphere down to ERATOSTHENES. This discussion is more critical than the preceding and seems in fact to suffer a little from hyper-scepticism. The claims of the pre-Socratics to the theory of sphericity are all rejected. That of PARMENIDES, substantiated by the testimony of THEOPHRASTUS (DIOG. LAERT. VIII 48, IX, 21) is pitted against the ignorance of ANAXAGORAS and DEMOCRITUS, who still held the disk theory (Arist. *de caelo* 294b). Professor HEIDEL argues that they thus had no notion of sphericity in spite of PARMENIDES' known influence on them, and that PARMENIDES himself therefore had no notion of sphericity. The argument seems weak and I think PARMENIDES' claim to have originated the theory of the spherical earth is still valid.

On pp. 124f. it is stated that ERATOSTHENES' measurement of the circumference of the earth at 252,000 stades "was too large by about 13¾ per cent, but it was the closest approximation attained in antiquity, and it was accepted by HIPPARCHUS". In a previous review in this journal (*Isis* XXVII [1937], 513), I called attention to the fact that there is uncertainty about the length of the stade used by ERATOSTHENES. Professor HEIDEL has apparently assumed a stade whose quotient in the Roman mile is 8 or 8 1/3 (186 or 178.6 m.). Neither is possible, however, and it is necessary to assume either a stade of ca. 159 m. (9 1/3 to a mile) (4), or, preferably, a stade of 148.8 m. (10 to a mile) (5). By these reckonings ERATOSTHENES' measurement becomes too small. Moreover, while STRABO (I 62, II 113) says HIPPARCHUS accepted ERATOSTHENES' measurement with reservations, PLINY (II 247) says he added 26,000 stades to it; and LEHMANN-HAUPT interprets this as a closer approximation to the truth.

University of Illinois. AUBREY DILLER

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statement that India lies between the autumnal equinox and the winter solstice (Strabo II 76).

(4) VIEDEBANTT, *Klio* XIV (1915), 232-252; XVI (1920), 94-108.

(5) LEHMANN-HAUPT, *Real-encycl. der class. Altertumswissenschaft* III A 2 (1929), 1934-38.

Théophile Gérold. — *La musique du Moyen âge.* 443 p. Paris, HENRI CHAMPION, 1932 (40 fr.).

— *Histoire de la musique des origines à la fin du XIV^e siècle.* 423 p., illustré. Paris. H. LAURENS, 1936.

THÉOPHILE GÉROLD's enviable reputation as a musicologist is based on a series of mediaeval and renaissance studies (1) "The Church Fathers and Music", "The Saint Agnes Play, a Fourteenth Century Drama", "The Bayeux Manuscript, a collection of Fifteenth Century Songs", "Fifteenth and Sixteenth Century Folk Songs", "The Oldest Melodies of the Protestant Church in Strasbourg", and "The Art of Song in France in the Seventeenth Century". More recently he has published two general works, "Music in the Middle Ages" and "The History of Music from its Beginnings to the End of the Fourteenth Century." We are here specially concerned with this final pair of books; for in them M. GÉROLD has set forth and illustrated his mature conclusions as to certain questions of musical theory and practice in the middle ages.

I

In his "Music in the Middle Ages" M. GÉROLD quotes more than one hundred and seventy-five pieces of music, about one hundred of which are complete hymns, songs, and so forth. Thus he illustrates the history of music from the simple melodies of CHARLEMAGNE's day to the polyphonic masterpieces of GUILLAUME DE MACHAUT. At the same time, he traces in lucid prose, the development of music, both vocal and instrumental, from Greece, Syria, and Byzantium in the early Christian times, to France, Germany, Italy and Spain in the fourteenth century.

In this volume M. GÉROLD specially emphasizes, (1) the neglected subject of instrumental music in the Middle Ages, (2) the transcription of early musical texts, (3) rhythm and notation, (4) the structure and character of early church music and of twelfth century "monodies", (5) the beginning of musical drama and (6) the development of early polyphonic music.

(1) Chansons populaires des XV^e et XVI^e siècles, Strasbourg, 1913.
L'Art du Chant en France au XVII^e siècle, Strasbourg, 1921.
Le Manuscrit de Bayeux, recueil de chansons du XV^e siècle. Strasbourg, 1921.
SCHUBERT, Paris, 1923.
J. S. BACH, biographie critique, Paris 1925.
Les plus anciennes melodies de l'Église Protestante de Strasbourg, Paris, 1928.
Les Pères de l'Église et la musique, Strasbourg et Paris, 1931.
Jeu de Saint Agnès drame Provençal du XIV^e siècle, Paris, 1931.

In his preliminary chapter on the first centuries of the Christian era, M. GÉROLD already points to the use (p. 9) of lyres and cithers and drums in early lay music, and to (p. 14) the cultivation of instrumental music in the tenth century by the monks of St. Gall. He calls attention later to a passage in the liturgical drama of Daniel (p. 65) which shows that drums, harps, and other instruments probably accompanied the actors' voices. From the thirteenth century he quotes (242-24) an interesting three-part fragment from Montpellier, in which the tenor seems to have been sung, while an organ played the upper and lower voices. Finally, he devotes a special chapter to the neglected subject of instrumental music (288-301) in which he quotes poems and other contemporary testimony, as well as half a dozen musical specimens, and traces the development of instrumental music from the troubadour RAIMBAUT DE VACQUEIRAS to ADAM DE LA HALLE and his pastoral comedy of "Robin et Marion".

M. GÉROLD opens his consideration of meter and notation by citing (6) a papyrus from the first quarter of the fourth century, — our earliest specimen of Christian music. Here the composer used a classic metre. M. GÉROLD reminds us that the hymns of Saint AMBROSE, by their "pagan" metrical musical forms, influenced his followers, — for instance FORTUNATUS (sixth century) and THEODOLPHUS OF ORLEANS (c. 800). But, as Mr. GÉROLD tells us, hymn writers replaced the classic rules of quantity, soon after, by a system of accented syllables. Though M. GÉROLD, unfortunately, prints no specimen of Ambrosian hymn, he illustrates this later development by quoting the famous "Ut queant laxis" (shades of Dom MOCQUEREAU) (2) in 8/8 time (3) (p. 71). One wishes that he had also found space for his own versions of, say, the "Victimae Paschali" or the "Dies Irae".

M. GÉROLD devotes a chapter to early musical notation with a convenient table (20-21) of neumes, Gregorian notes and modern equivalents. He then takes up the Gregorian melodies. COMBARIEU (4) treated the Gregorian chant as a problem in musical Aesthetics; though he could hardly call it music, still he decided that it had an austere quality which, in its strange way, must be recognized somehow as beautiful. M. GÉROLD, on the other hand, quotes (p. 43) ODO OF CLUNY, who said that only symmetry interrelating all the phrases of a melody could produce an

(2) Le Nombre Musical Grégorien, par ANDRÉ MOCQUEREAU. Rome, 1908-1927, vols. 2.

(3) Compare "Gregorian" version in *Liber Usuales*, Desclée, Tournai (1923), p. 1342.

(4) Histoire de la Musique par JULES COMBARIEU, Paris, Vols. 3, 1913-1919.

artistic effect. And analyzing, for example (p. 32) the "Hodie Christus Natus est", M. GÉROLD shows the symmetry of its structure.

As for those much discussed questions about how Gregorian texts should be transcribed and how the Gregorian melodies should be sung, M. GÉROLD quietly remarks "Numerous texts of the eleventh to the fourteenth century show that people in the Middle Ages held that the neumes stood for notes of different value, long or short, in different combinations, — which would prove that Gregorian rhythm was measured music. This question has been vigorously discussed for some years; if the authority of mediaeval texts were recognized, the execution of Gregorian melodies, as now practiced and taught by the Benedictines, would be seriously menaced *(fortement battue en brèche)*" (5). Tempering valor with prudence, however, he offers no new versions, but in his all-too-few specimens of Gregorian melody (pp. 31, 32, 35-37) simply quotes the official musical texts.

Professor KARL YOUNG's monumental work on the Liturgical Drama (6) leaves aside, for treatment by later scholars, the music which was almost, if not quite as essential to these dramas as the texts. M. GÉROLD (58-65) takes up the music of a few of the dramas, published almost a century ago by COUSSEMAKER (7). He emphasizes the metric character of the lines in certain cases, and re-transcribes the corresponding music (62-64) with a significantly novel metric effect.

Turning to the interpretation of troubadour songs, etc., M. GÉROLD considers RIEMANN's two-time theory, and rejects it (p. 105). He also considers the contrasting theory of rhythmic "modes" which JEAN B. BECK built up on the writings of mediaeval musical theorists (JEAN DE GARLANDE, JEAN DE GROCHEO, etc.). M. GÉROLD concludes (p. 106) : "On the whole, and until wider discoveries are made, the modal interpretation seems to be the one which has the solidest base historically and theoretically, and which gives us the best results. Of course we must be careful not to apply too rigorously to these melodies the modern idea of down beat and up beat, and not to exaggerate the importance of the bar. We should consider the melodic phrase as a whole, and keep its supple, fluid character."

With the musical history of the later thirteenth and of the fourteenth century, M. GÉROLD goes on to the beginnings of mensural notation (249-253) based on triple time, then to the precise but more and more complicated notation of the fourteenth century (310-311). He deals

(5) Pp. 19-20. See also pp. 428-429.

(6) KARL YOUNG : The drama of the mediaeval church (2 vols., Clarendon Press, Oxford 1933).

(7) Drames Liturgiques du Moyen Age, Par E. COUSSEMAKER, Paris, 1841.

with this subject carefully and accurately, — up to a certain point. Then, after pointing out that Italian notation of this period is simpler than the French (p. 344), he leaves readers in search of detailed information on late fourteenth century notation to more specialized works.

M. GÉROLD's three chapters on "Lyric melodies for texts in the vulgar tongue" are the *pièce de résistance* of this book. Comprising one hundred and twenty-five pages (or almost a quarter of the whole), they include (1) the structure of the melodies, and (2) the relation between the poems and their melodies.

M. GÉROLD analyzes in masterly fashion the structure and expressiveness of a dozen trouvère songs (GACE BRULÉ, the Chatelain de Coucy MONIOT DE PARIS, etc.) and of fourteen troubadour songs (Le roi de Navarre, BERNARD DE VENTADORN, FOLQUET DE MARSEILLES, JAUFRÉ RUDEL, GUIRAUT RIQUIER, etc.), besides two *Chansons de Toile* and half a dozen other anonymous songs.

As we have already seen, M. GÉROLD provisionally approves Mr. JEAN B. BECK's "modal" theory as a basis for transcribing musical texts of the Troubadour period. In dealing with these songs, he therefore either himself transcribes them according to the "modal" system, or quotes them from other transcribers who have adopted more or less the same system (8).

The late thirteenth century brings M. GÉROLD, of course, to polyphonic music. In studying its beginnings with LEONINUS and PÉROTIN, he confines himself to the written word. From thirteenth century motets, however, he quotes a couple of dozen specimens. He analyzes their character and structure, moreover, with delightful sympathy and keenness.

For the fourteenth century M. GÉROLD gives us, first, one specimen of the polyphony of "FAUVEL". Going on to the great poet and composer, GUILLAUME DE MACHAUT, he tells us ably of his life and works, and quotes from his poems, and from five of his beautiful (and not easily obtainable) two- and three-part ballads.

In reviewing such salient aspects of M. GÉROLD's "Mediaeval Music," one cannot wholly omit his chapters on musical theorists before the twelfth century, on the music for Latin poems, and on the music which may have been used in chanting the *Chansons de Geste*; all of them well written and well stocked, as usual, with references. One must also at least mention his excellent chapters on teaching music in the Middle Ages (353-367) and on musical instruments (368-423).

(8) For instance, transcriptions by the eminent Catalan musicologist, HIGINI ANGLÈS. Les Melodies del Trobador, GUIRAUT RIQUIER, *Estudis Universitaris Catalans*, (1926) XI, text pp. 1-30, songs pp. 31-78.

Just a few words on M. GÉROLD's treatment of non-French music. In his chapter on the Minnesinger songs, he traces their French origins, and at the same time generously appreciates the dozen specimens which he quotes. When it comes to Fourteenth century music outside France, however, his treatment of this subject is scanty. Such "sins of omission" are involved in the very plan of this book. As M. GÉROLD says in his introduction (p. xi) it was to be one volume in that excellent series "Les Classiques Français du Moyen Age." For that reason he says, "lay music is treated more in detail than sacred music; and among works of lay music French works preponderate. This last point, moreover, follows almost as a matter of course; for, from the twelfth to the fourteenth century, France was in advance of other nations and set the fashion in musical composition." More serious are certain limitations involving the use of this book. Though M. GÉROLD twice refers to the Bibliography (pp. 29, 49), the Bibliography somehow was omitted. The brief indexes of names and of subjects, moreover, leave much to be desired; for instance, GUIRAUT RIQUIER, 100, 119, PÉTRARQUE, 84, etc., and RAIMBAUT DE VACQUEIRAS, 290, are omitted from the Index of Names; and Byzance, 418, etc. Carmina Burana, 77, Chanson de Roland, 88, Cluny, 357, etc., Dies Irae, 53, Notation, 219-253, 310-311, and Victimae Paschali, 52, are omitted from the Index of Subjects. It is to be hoped that the Indexes will be amplified in subsequent editions, and the Bibliography inserted. Meantime, the footnotes and the "*Notes Additionelles*" (427-433) supply the student with invaluable bibliographic material.

II

As befits one of the series on the History of Art edited by HENRY MARCEL, M. GÉROLT's "History of Music from its beginnings to the end of the fourteenth century," is handsomely printed in octavo, and illustrated with full-page, collotype reproductions from sculpture, miniature and painting. These illustrations are not merely a delight to the eye : they suggest the development of musical instruments and their use from Egyptian times down to the beginnings of the Renaissance. In the section of this book on pre-Christian music, they show us the harp, already, in an Egyptian bas-relief, the lute in a Greek relief, a sort of double fife and a harp accompanying the dance on an Etruscan vase, and the same instruments in a wall painting at Pompeii. In the main part of this book they show us musical instruments century by century : ninth century miniatures of a player plucking the three strings of a sort of viol, an ancestor of the guitar, also of the same instrument accompa-

nying the harp and a sort of horn; from the tenth century, the familiar figure of King David with his harp; from the eleventh, what we may call fifes with horns, also players on harp, small bells, viol, fife and organ, and players on two harps, a viol, a sort of Panpipes and a horn; from the twelfth, three viols, with small bells, harp and "fife", also players on viol, small bells and a sort of cither; from the thirteenth, miniatures show us a new combination, — viol, trumpet and drum, — a player, too, on the small portable organ so familiar in later centuries; from the fourteenth, a viol-player leading a chorus, also shepherds with bag pipes and "fife", and shepherds with drum and plucked viol, — from this century, too, viol players with drummers from the "Roman de Fauvel", and the Italian composer FRANCESCO LANDINO playing a portable organ. Here surely is evidence enough to confute the musical "historians" who have copied one another in asserting that instrumental music began only with the Renaissance.

Turning from these documents to the history itself, we find the author devoting the first third of his work to five chapters on the pre-Christian era. In the absence of authentic or sufficiently studied musical documents he gives us, in the first three chapters, brief accounts of musical instruments and of the functions and theory of music in Egypt, Babylon and Assyria; among the ancient Jews; and in Phoenicia, Assyria, Asia Minor, India and China. In the fourth chapter M. GÉROLD gives a lucid and fairly thorough account of Greek music. Here the existing relics enable him to quote two charming songs, the Epitaph to SEIKILOS (57) and MISOMEDES' Hymn to the Muse (90). He does not attempt either the full quotation of Greek musical sources, or the elaborate statement of musical theory which one finds, for instance, in MAURICE EMMANUEL's admirable study (9). In the chapter on Rome with which M. GÉROLD closes the first part of this history, he makes good use of existing literary documents, but has to report the continued absence of one scrap of papyrus or a single carved stone to record for us any Roman melody.

M. GÉROLD devotes the remaining two thirds of this volume to the period already so ably treated in his little volume on Music in the Middle Ages. In this part of the history, however, he is far from just dishing up his old material again. Besides illustrating his subject with the series of contemporary miniatures to which we have already referred, he quotes many illustrative specimens of music, restudies his subject from a less musically analytic point of view, takes up fresh topics, and reports certain conclusions arrived at since writing the earlier volume.

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(9) See Encyclopédie de Musique, ed. by LAVIGNAC.

Unhampered by special limitations of plan, M. GÉROLD takes advantage of his freedom in this volume to study new subjects : — Gregorian melodies and the formation of the liturgy; notation in the Eastern Churches and among the Jews in its relation to notation in the Latin church, (Chapter XIII); also music in Spain and Germany.

He makes some of his most interesting contributions, here, in studying church music. He returns to the subject of Ambrosian hymns by reminding us (149) that "The metrical and musical forms of the hymns of Saint Ambrose are derived from ancient classic art. The versification follows the rules of quantity." So far so good. But he goes on : "The iambic metre *which he uses in his verse* became typical of the liturgical hymns of the West"; and ignoring the rules of quantity, he quotes the famous hymn "Aeterne rerum conditor", (149) verse and melody, in the following iambic form : Aĕtĕrnĕ rĕrŭm cōndĭtōr. This is the more remarkable since, in "Music in the Middle Ages" (38) he quoted the same words with notation to indicate the correct quantities thus : Aētērnĕ rērūm cōndĭtōr.

M. GEROLD quotes new specimens of Gregorian melodies; also of proses and tropes; and he illustrates the liturgical dramas with a dozen new musical specimens.

To accompany his fresh and more historic treatment of the troubadours and the trouvères, he quotes new specimens by GACE BRULÉ, JAUFRÉ RUDEL, BERNARD DE VENTADORN, JEHAN ERARS, GUIRAUT RIQUIER, CONON DE BÉTHUNE, AUDEFROI LE BASTARD, GUIRAUT DE BORNEH, and others of less note. From the minnesingers he quotes four newly chosen songs. He quotes seven thirteenth-century motets for the first time. To illustrate instrumental music, he quotes RAIMBAUT DE VACQUEIRAS' "Kalenda Maya" entire, also two additional specimens. Under fourteenth century polyphony, he rightly emphasizes GUILLAUME DE MACHAUT with his lay "J'aime la flour", and illustrates a careful appreciation of GUILLAUME DE MACHAUT's mass by quoting from it (273-274) a passage of most expressive music.

As this brief recapitulation shows, M. GÉROLD has made this history quite as significant an anthology of mediaeval music as his earlier volume. In this respect, indeed, — as in others, — one book supplements the other; and both are indispensable to lovers and students of mediaeval melody and of early counterpoint. As for the pair of most controversial subjects treated in Music in the Middle Ages, M. GÉROLD again takes up the questions, specially associated with Dom MOCQUEREAU, as to how Latin neumes should be interpreted, and how the Gregorian melodies should be sung. Dom MOCQUEREAU's theories, he says (181) "are engaging (*ont quelque chose de séduisant*) but also are rather justly attacked.

Another Benedictine, Dom JEANNIN, has raised serious objections, from the point of view of the relation between rhythm and measure." M. GÉROLD (181-182) states the case for all sides in the controversy, and sums up by observing that "the eleventh and twelfth century authors' assertions and explanations are evidently weightier than modern constructions."

As for the second moot point argued in "Mediaeval Music," — Mr. BECK's theory of rhythmic modes as applied to the transcription of troubadour songs, — M. GÉROLD omits all mention of it in this volume. His action, however, speaks perhaps more eloquently than words; for every troubadour or trouvère song which he quotes is transcribed, not as RIEMANN but as Mr. BECK or one of his followers would transcribe it.

When we come to questions on the frontier of musical theory, M. GÉROLD disappoints the reader, as any candid historian must. About the Mozarabic music of Spain, for instance, M. GÉROLD says (160) that so few researches (comparatively speaking) have been made, and so little published, that few if any conclusions of value can be stated.

As to early Byzantine notation, M. GÉROLD remarks (164) "many a problem has been solved only in doubtful fashion, and more than one point is still obscure." He distinguishes three periods (169) in the development of Byzantine notation : the first from the eleventh to the thirteenth century; the second, a period of change between the thirteenth and fifteenth centuries; and a third period of reformed notation. He shows a probable relation between the neumes of the first period and those of the western church. In setting forth the difficulties encountered by scholars in trying to interpret the early neumes, M. GÉROLD cites from French and German work of some years back (1904-1913), and neglects the recent studies of HOEG, TILLYARD and WILLESZ (10).

Turning to the questions (raised by JULIAN REBERA, H. G. FARMER and others) as to the possible influence of Hispano-Arabic culture on the development of French music, M. GÉROLD (310-311) points out that AL-FARABI bases his ideas on ARISTOTLE and on ARISTOXENES; that

(10) Codex Theol. Gr. 181, Vienna. phototype reproduction, ed. by CARSTEN HOEG, H. J. W. TILLYARD and EGON WILLESZ. Monumenta Musicae Byzantinae Subaidia, Vol. I, Copenhagen, 1935.

La Notation Ekphonétique par CARSTEN HOEG, M. B. S., Vol. I fascicule 1, Copenhagen, 1935.

Handbook of Middle Byzantine Notation, by H. J. W. TILLYARD, M. B. S., Vol. I, fasci. 1, Copenhagen, 1935.

Trésor de la Musique Byzantine, par EGON WILLESZ, Paris, 1934, über Rhytmus und Vortrag der Byzantinischen Melodien, von EGON WILLESZ, *Byzantium* XVIII (1st half year), pp. 33-66.

AVICENNA (980-1037) followed in AL-FARABI's footsteps; that the twelfth century school at Toledo was much influenced by Arabic philosophy, and that GERARD OF CREMONA translated AL-FARABI about 1140. Arab philosophers, therefore, may well have influenced the monastic philosophers of Spain and France. As for any practical influence in music, however, M. GÉROLD argues as to vocal music — that melodies derive their form more or less from the poetic texts with which they are connected; that mediaeval Arabic poems are much lighter and more lively and are freer in form than the Troubadours' poems, and that Arabic vocal melodies accordingly were too different fundamentally from Provençal melodies to influence them.

As for musical instruments, on the other hand, M. GÉROLD remarks that AL-FARABI describes three forms of lute in great detail, and that one form, the "rebab" or rebec (409-410) found favor among Christians though mostly in a modified shape.

On the whole, then, M. GÉROLD concludes that, in the absence of new discoveries, we must reduce the theory of Arabic influence on the development of western music to the narrowest limits.

In this history, as in his "Music in the Middle Ages", M. GÉROLD emphasizes the primacy of French music, especially in his chapter (377-383) on Italian Music of the fourteenth century. While we need not quarrel with him on that score, we cannot but regret M. GÉROLD's failure at least to refer to the primacy of French civilization, of which music was so important a part. With some reference to the background of French principalities in the eastern Mediterranean, Frankish knightly poems in Constantinople, French letters so dominant in Italy that BRUNETTO LATINI and MARCO POLO wrote in French, with that background in view, M. GÉROLD's readers would better understand the facts of specialized musical history which he so ably sets forth.

For the practical uses of scholars, M. GÉROLD provides an index of names (but, alas, no index of subjects) and a bibliography (419-433) in which the authors and their works are arranged, not alphabetically, but vaguely according to the topics treated in successive chapters. The bibliographic notes, at the bottom of pages, are very useful.

These two works of a mature scholar and master of musical insight will be welcome alike to musicians and historians. The first is invaluable as a handbook of mediaeval music; the second recounts the history of music with a wealth of illustrative material that will make it important even after the progress of scholarship has, perhaps, supplanted some of the author's conclusions. The two books together form a corpus of mediaeval music, probably unequalled elsewhere today.

(*Cambridge, Mass.*) HENRY COPLEY GREENE

Philip K. Hitti, Professor of Semitic literature in Princeton University. — *History of the Arabs.* xvii + 767 p. London, MACMILLAN, 1937.

This is a most imposing book, wide in its scope and possessing many excellent qualities. Its object is to cover the history of the Arabs and the races and nations associated with them from the earliest times in Arabia to the Ottoman conquest of Egypt. There is an elaborate but still incomplete 60 page index giving proper names, book-titles, subjects, Arabic words and technical terms. There are 20 good clear maps and 55 illustrations of real interest. There are no chronological tables and the "selected bibliographies", which were drawn up and were to have been appended to each chapter have not been printed in the book. For this omission, in all probability, the author is not responsible, but it has destroyed a great part of the usefulness of his work. There are references at the foot of the pages, but by far the most of those are to Arabic texts and there are few to the books of western scholars. Presumably those were given in the cut-out bibliographies. When they occur in footnotes they may be quite obscure, e.g., that to "de Zambaur", p. 605, note 3. And the name of this great chronological historian does not seem to be in the index. The complete reference however, is in note 2 on p. 650, with a reference, also, to STANLEY LANE POOLE's equally important "Mohammedan dynasties", also not in the index. All this raises the question as to the readers for whom the book is intended. Presumably from the nature of the majority of the references those readers can use Arabic texts, but the book itself throughout bears the stamp of semi-popular university lectures. The hearers of these lectures and the readers of this book would need in their further studies quite other guidance.

The book is divided into five parts : Part I, Preislamic Arabia, 108 p.; Part II, Rise of Islâm and the early Khalîfas, pp. 111-186; Part III, Umayyads and 'Abbâsids, pp. 189-489. There are chapters on the intellectual aspects of life under the Umayyads, on the 'Abbâsid state and society, on scientific and literary progress, on education, fine arts, sects and heresies. Part IV, Arabs in Europe, Spain and Sicily, pp. 493-614. There are chapters on political, economic and educational institutions, intellectual contributions, art and architecture; Part V, Egypt and Syria under the Fâṭimids and Mamlûks, pp. 617-705. There are chapters on Fâṭimid Egypt, the Crusades, cultural contacts, intellectual and artistic activity.

All this is put fully and clearly before the reader with an abundance of detail often picturesquely expressed. With so wide a field, as Professor HITTI says in his preface, he has had to rely often on the researches of others, his predecessors. And here the lack of the bibliographies

is painfully felt. We should like to know upon whom he has relied. In some places it is plain that he has used recent and good authorities, e.g. ASIN on IBN 'ARABÎ, but in other cases his authorities must have been either eccentric or quite antiquated. On so important a matter as the text of the *Qur'ân* the statement on p. 123 is quite impossible and what is meant by saying that "there are probably more variations in the reading of one chapter of Genesis in Hebrew than there are in the entire Koran" is unintelligible to the present reviewer. The *Qur'ân* commentaries are full of various readings. There are special books devoted to them and these books are being edited and published at the present time by both western and eastern scholars. The problem of the *Qur'ân* text is very much to the point at present, and the statement which we used, years ago, to read in popular books that there are no variant readings to the *Qur'ân* is simply nonsense. To go to the opposite extreme in Arabic literature, Professor HITTI's statement on "The Arabian Nights" (pp. 404-05) is almost equally inadequate. The present reviewer ventures to refer to his article in the Supplement to the "*Encyclopedia of Islâm*" for what has been worked out on that subject. As these two books probably — and rightly — represent Arabic and Islâm to the general reader, statements on them should be especially careful.

There is a page and a half (p. 431 f.) on AL-GHAZZÂLÎ and a high but indiscriminating eulogy. His *Maqâṣid al-falâsifa* is spoken of as though it contained his own orthodox speculations. It is, in fact, a very objective statement of the positions of the Aristotelian-Neoplatonic philosophers, to be refuted in his later *Tahâfut*.

It is hardly fair to SALE to speak of his really excellent translation of the *Qur'ân* as a paraphrase based on the Latin version of MARRACCI (p. 127, note). He undoubtedly used MARACCI but he translated from the Arabic and used Arabic commentaries.

Some minor details : Whatever *Mu'allaqât* (p. 83) means when used of early poems, it certainly does not mean "Golden Odes". Nor does 'Abdullâh (p. 101) mean "the servant or worshipper of Allah"; it means "the slave, or property, of Allah"; perhaps our "creature" comes nearest in theological implication. The puzzling question of *ḥanîf* (p. 108) cannot be adequately settled by an article published in 1903, even though the authority is Sir CHARLES LYALL. D. B. MACDONALD

Fujinami, Gôichi. — *I-ka sentetsu shôzô shû* (A collection of portraits of the Confucian philosophers who practiced medicine) 376 p. 165 portraits. Tokyo, Tôkô shoin, 1937. (Yen 10.00).

During his sojourn in Germany, Dr. FUJINAMI saw many portraits of

famous physicians and scholars in medical science, and was impressed by their importance for the appreciation of personality. Especially those caricatures that successfully caught the human qualities of these scholars interested him, for he writes : "In Japan people take scholars too seriously and often forget that they too are human beings." "An attempt," he continues in his introduction, "to get acquainted with a great personality only through his writings and biography is like that of trying to view a mountain in rain and mists. A biography without a portrait gives only the half and not the whole of the personality."

Some yers ago Dr. Yû FUJIKAWA wrote a series of biographical sketches of the famous physicians for the *Chûgai iji shimpô*, a Japanese journal of medicine, illustrating them whenever possible with portraits. At that time, many of the descendants of the famous men of medicine lived in Tokyo or elsewhere, and treasured the portraits of their distinguished ancestors. In the great earthquake of 1923, however, many of them were destroyed, and as time goes on, it will be more and more difficult to collect them. As the best possible means of preserving them to posterity, Dr. FUJINAMI began to search for them. The number gathered in the present volume, he considers, is very small, but they represent a wide range both in time and specialization. The first portrait sketch is that of GYÔGI who lived from 670-749, a priest who travelled through Japan, encouraging arts and industries, improving communications and administering medicine. The volume closes with the portrait of NAOTADA KOJIMA who died in 1848. The portraits are arranged in chronological order and are accompanied by short biographical sketches and lists of their works.

The present work is dedicated to Dr. Yû FUJIKAWA, who is the father of the Japanese history of medicine. The best way of giving the reader an idea of its contents, is to give one of the biographical sketches, together with the portrait illustrating it, a portrait painted by KANO, HIDENOBU (d. 1712).

KAIBARA, EKKEN (1630-1714) was a native of Chikuzen Province in Kyûshû where his father was a physician to Lord KURODA. His personal name is ATSUNOBU. His father and three elder brothers taught him first Chinese classics and then medicine so that before he was fourteen years old, he was well started in his career as a scholar. At nineteen, he studied medicine under MUKAI, REIRAN (1609-1677) and at twenty-six EKKEN went to Edo to practice medicine. At thirty-eight, however, he gave up his profession to devote his life to philosophy and science. The remaining years of his life were spent in travelling about the country collecting herbs, helping the poor, and improving farming and irrigation. *Yôjô-kun* (A practical hygiene), *Yamato Honzo* (Japanese herbal) *Yamato*

Honzo kômoku (A commentary on the Japanese herbal), and the *Sai-fu* (A treatise on leafy vegetables) are primarily written to improve the daily life of people. He wrote in simple language a great number of important works on education and practical morality. A scholar once

said to EKKEN : "You have studied Chinese classics, but you write popular books, and you are going to be a laughing-stock among the scholars of Japan." EKKEN replied : "Many distinguished scholars have already written for the learned men. I, being a simple man, write popular books in Japanese syllabary for the common folks and for children, which I hope will be helpful. We eat rice and spend valuable time, and if I can be helpful to people by writing popular books, I do not care whether scholars laugh or not."

SHIO SAKANISHI

J. G. Crowther. — *Men of Science.* xiii + 332 pag. New York, W. W. NORTON & Co., 1936, ($ 3.50).

J. G. Crowther. — *Famous American Men of Science.* xvi + 414 pag. W. W. NORTON & Co., 1937, ($ 3.50).

These two books deal with nine men of science, five English and four American, who by their achievements in the field of physics made outstanding contributions to human knowledge and progress. The subjects who sit for their portraits to the author are HUMPHRY DAVY, MICHAEL FARADAY, JAMES PRESCOTT JOULE, WILLIAM THOMSON LORD KELVIN, JAMES CLERK MAXWELL, BENJAMIN FRANKLIN, JOSEPH HENRY, JOSIAH WILLARD GIBBS, and THOMAS ALVA EDISON.

Mr. CROWTHER nowhere tells us why he has concentrated all his attention upon the physicists, nor does he consider it necessary to explain that not all men of science are physicists, on the presumption, no doubt, that the readers of these books will none of them be so uninformed or so stupid as to commit so egregious an error. But this is not the point, for in the first place the titles of Mr. CROWTHER's books are logically inaccurate, *sensu stricto*, and in the second place as a consequence of this inaccuracy the reader obtains a quite erroneous impression of the actual significance of the events with which the author deals. Physicists are a particular class of men of science, and treated as a group it would certainly have been in every way more satisfactory to have called them by their proper name rather than by the name of the very broad class into which they fall. Mr. CROWTHER's book is distinctly not about men of science, but about men who worked in the field of physics, and this, indeed, is the major reason for Mr. CROWTHER's book about these men, the proof of which is that had these men of science been anything other than physicists there would have been no book by Mr. CROWTHER about them, however distinguished their work in other branches of science might have been.

The close relation between the progress of physics and the advance of industry can be paralleled in the case of no other science with the possible exception of chemistry and in recent years of geology, and for this reason in a work which undertakes to demonstrate the relation between physical discovery and industrial development, it is an error even by unintended implication to suggest that the relations between other sciences and industry are or have been of a nature similar to those which exist in the case of physics and industry.

At a time when the economic determinance of everything under the Marxian sun is being urged by those whose heads have been a little overheated by the emanations from that brilliant star it is necessary to point out the fallacies involved in the thesis even when they are expressed

only negatively as in the titles of Mr. CROWTHER's really excellent volumes. When Mr. CROWTHER writes of "the mutual stimulation of science and industry" we must take him to mean "physics and industry". And when he tells us that the inspiration for these studies came from Professor B. HESSEN's *The Social and Economic Roots of Newton's 'Principia'*, a paper read before the International Congress on the History of Science in 1931, we may readily see how Mr. CROWTHER, himself a physicist, fell into the error, perhaps unwittingly, of generalizing for "science" a relation which in his own science, physics, he had found to be true. It is in Mr. CROWTHER's loose usage of the term "science" that his erroneous generalization is implicit. Professor H. LEVY (to whom the author never once refers) in his *The Universe of Science* (London, 1934) though he deals with science as a whole has completely avoided this pitfall.

Naturally, in his endeavour to show how the factor of industry influenced the work of the nine men who figure in these two volumes, Mr. CROWTHER has given something of a one-sided picture of them; even so the picture which he has given is a good deal truer than the vacuous conventional studies to which we are usually treated, and which completely neglect any consideration of that very factor which Mr. CROWTHER, by isolating it, has in these volumes given what appears to the reviewer to be a disproportionate prominence. But perhaps such a criticism is unfair since what Mr. CROWTHER set out to show was the part which this one factor, commonly overlooked, had played in the development of physics, and hence, an apparent disproportion was unavoidable. This may be so, but the disproportion remains. As a contribution, therefore, to the more complete understanding of the lives and works of these nine great men Mr. CROWTHER's volumes are to be heartily welcomed — we would not understand him to intend them to be anything more than that. They make excellent and instructive reading, and that is adequate enough justification for their existence ; one does not have to agree with Mr. CROWTHER to profit by what he says. We look forward to further volumes in the history of science from his pen, and we should particularly like to see what Mr. CROWTHER would make of the biologists.

The volumes are well illustrated; there are short bibliographies, and adequate indices.

New York University. M. F. ASHLEY-MONTAGU

R. B. Cattell, J. Cohen. and **R. M. W. Travers** (Editors).—*Human Affairs.* P. ix+360. New York: The MACMILLAN Co., 1937. ($ 4.25).

This book, planned and edited by three young Englishmen, is subtitled

"An exposition of what science can do for man." The exposition is intended to make its appeal to a very wide class of readers, to the general public as well as to the "clerc." The Editorial contributed by the Editors makes clear the aims and purposes of the book, and of the journal which they hope to publish if their book meets with a satisfactory response. It is greatly to be desired that their hope may be realized, for while the contributions which follow the Editorial—excellent as some of them are—do not perform what is promised in the Editorial, the latter is itself one of the most admirable calls to intellectual order and social action that we remember to have seen for a long time; a vigorous Manifesto of Scientific Humanism, a charter of faith and action. A journal piloted by three such as yet "unacknowledged legislators" would, at least, be interesting.

The Editors feel that the scientist has been too long dissociated from human affairs, and realizing that some scientists have in recent years become conscious of this and have awakened to the fact that the role of the scientist could be a very effective one for good in the conduct and regulation of human affairs, they have asked fourteen leading scientists to present their views on what science can do for man. The result is hardly very exciting, and I do not see that any of the contributors have answered the question; that is to say, if the question was ever put to them. The contributions are interesting enough in themselves as a collection of essays on various topics relating to man on the one hand and to science on the very definite other hand, but they most unfortunately do not tell us what science can do for man. This we are left, for the most part, to discover for ourselves, as in a glass, darkly. Still, even if *Human Affairs* doesn't do all that it sets out to do for at least one reader, it is for all that a book to be read, if only for the extraordinarily good Editorial which opens the volume,—but that would be unfair to the greater part of the rest of the book. The contributors and their contributions are:

J. B. S. HALDANE, *Society as a Biological Experiment*; D. KATZ, *Psychological Needs*; A. S. J. BASTER, *Economic Planning*; E. CHAMBERS, *Psychology in the Industrial Life of the Nation*; Lord RAGLAN, *Race and Modern Society*; C. P. BLACKER, *Eugenics and Social Progress*; Sir HENRY BRACKENBURY, *Medical Progress and Society*; R. B. CATTELL, *Education, and the Sciences of Human Nature*; M. GINSBERG, *Sociology and Human Affairs*; HAVELOCK ELLIS, *Eros in Contemporary Life*; B. MALINOWSKI, *Anthropology as the Basis of Social Science*; EMANUEL MILLER, *Neurosis and Civilization*; K. MANNHEIM, *Present Trends in the Building of Society*; The Earl of LISTOWEL, *Science and Legislation*; W. MCDOUGALL, *Philosophy and the Social Sciences*.

A very happy feature of the volume is the photographs of the editors and contributors. There is an appendix devoted to short biographical accounts of each of the contributors, and there is an index.

New York University. M. F. ASHLEY-MONTAGU.

Eric Temple Bell. — *Men of mathematics.* xxi + 592 p., 29 illus. New York, SIMON and SCHUSTER, 1937.

There are many ways of dealing with such an immense and many-sided subject as the history of mathematics, and whichever one's point of view, one might try to write a conseeutive and relatively complete account or restrict oneself to selected parts. The author of this book has chosen the second alternative, and has simplified his task considerably by a double restriction. He has selected *some* men of mathematics, and for each of these he has selected *some* achievements. The first selection is somewhat arbitrary, the second, unavoidable if one aims at satisfying as large a potential audience as possible.

There can be no quarrel about that, though one cannot help wishing that a writer endowed with as much mathematical insight and literary talent as the author would address himself to the more difficult task of writing a history of mathematics covering, however briefly, the whole field. Such a book is badly needed. In the meanwhile the present one will render great services and the more so because it is very largely devoted to the last century and a half, a period generally neglected in the historical textbooks.

On the whole I like BELL's selection of topics very much, though I was surprised that he had not been tempted to include a chapter on JACOB STEINER and v. STAUDT, and his curt dismissal of JULIUS PLÜCKER with the sentence "The one gifted man who might have done WEIERSTRASS some good..." (p. 412) gave me pain. However, one cannot have everything and as soon as the idea of "selection" is accepted it is perhaps wiser to restrict it and to prefer a more elaborate account of a few men to a superficial one of many more. I read the whole book with pleasure and alacrity, in spite of the fact that the author annoyed me more than once. His treatment of each mathematician is generally sufficient, except with regard to Sir WILLIAM ROWAN HAMILTON, with whom it seems to me he did not deal quite fairly. To be sure the quaternions have been so completely replaced by tensor analysis that they have almost become an archaeological curiosity. Nevertheless HAMILTON's achievement as achievement can never be superseded. The quaternions were finally discarded, not because they were not good, but because a far better instrument had been discovered. At present there is hardly a mathematician who can appreciate the qual-

ities of the quaternions at their full value for his knowledge of them is far too superficial. An instrument which one cannot use is a poor instrument indeed. The author remarks (p. 359) that HAMILTON "seems to have been unacquainted with non-Euclidean geometry". I doubted that statement but found it to be correct; however let us remember that he died in 1865, and that the mathematicians of his generation who were genuinely interested in the subject were very few. A lack of interest in non-Euclidean geometry, which would be disgraceful to-day, needed no justification seventy years ago.

The longest chapter by far (52 p.), and one of the best, is properly devoted to GAUSS. It is the best account available in English (within the non-technical limitations of the book) and I will expect my Harvard and Radcliffe students to read it carefully. However, I think that BELL has exaggerated the loss of time caused by astronomical computations. To begin with, GAUSS loved computations; they were for him a form of recreation. In the second place his computations were seldom passive and idle as those of a professional computer; they helped him find new methods, they stimulated him in various ways. See M. BRENDEL's memoir "Über die astronomischen Arbeiten von GAUSS" (*Materialien für eine wissenschaftliche Biographie von* GAUSS, Heft VII, 106 p., Leipzig 1919). After all, even a GAUSS cannot be dealing with the highest kind of mathematical abstractions every hour of the day. He needs some relaxation, and a mathematical relaxation would be peculiarly exhilarating.

The work is very readable, but it would have been even more readable, if the author had not tried to enliven his style with cheap jokes and silly remarks. Here are a few exhibits :

"GAUSS was too vital to die or to witness death." (p. 245, what does that mean?), "ABEL's proof is like a statue by PHIDIAS; some of the others resemble a Gothic cathedral smothered in Irish lace, Italian confetti, and French pastry." (p. 322, could one imagine a worse mixture of metaphors?), "The hippopotamus is said to have a tender heart, by those who have eaten that delicacy baked, so a thick skin is not necessarily a reliable index to what is inside a man." (p. 285, apropos of CAUCHY). This may pass for deep wit in Hollywood, than which there is no place on earth where more sophistication is combined with more ignorance... What kind of readers did the author expect to attract with such boorish graces? are they worth having? and how much of his book will they read anyhow? There are sallies of the author which I did enjoy, above all his onslaught on the "other" HAMILTON, the Scotch philosopher Sir WILLIAM HAMILTON (1788-1856).

As the author does not quote his sources it is difficult to measure his accuracy, and his book can be used only for reading, not for reference or study. The most valuable parts of it are not the purely historical, the correctness of which cannot be readily ascertained, but the mathe-

matical remarks, drawn from his own rich experience. I shall now give a few of these, hoping that they will help the reader to forget as quickly as possible the other extracts quoted above.

"The theory of the potential is more significant today than LAPLACE ever dreamed it would become. Without the mathematics of this theory we should be halted almost at the beginning of our attempt to understand electromagnetism. Out of this theory grew one vigorous branch of the mathematics of boundary-value problems, today of greater significance for physical science than the whole Newtonian theory of gravitation. The concept of the potential was a mathematical inspiration of the first order — it made possible an attack on physical problems which otherwise would have been unapproachable." (p. 179).

"FOURIER's main advance was in the direction of boundary-value problems, the fitting of solutions of differential equations to prescribed initial conditions, probably the central problem of mathematical physics. Since FOURIER applied this method to the mathematical theory of heat conduction a crowded century of splendidly gifted men has gone further than he would ever have dreamed possible, but his step was decisive." (p. 198). "If FOURIER could revisit the glimpses of the moon he might be disgusted at what has happened to the analysis he invented for "public utility and the explanation of natural phenomena." So far as mathematical physics is concerned FOURIER analysis today is but a detail in the infinitely vaster theory of boundary-value problems, and it is in the purest of pure mathematics that the analysis which FOURIER invented finds its interest and its justification." (p. 338).

"GAUSS, ABEL, and JACOBI, by their extensive and detailed elaboration of the theory of elliptic functions, in which complex numbers appear inevitably, provided a testing ground for the discovery and improvement of general theorems in the theory of functions of a complex variable. The two theories seemed to have been designed by fate to complement and supplement one another — there is a reason for this, also for the deep connection of elliptic functions with the Gaussian theory of quadratic forms... Without the innumerable clues for a general theory provided by the special instances of more inclusive theorems occurring in elliptic functions, the theory of functions of a complex variable would have developed much more slowly than it did — LIOUVILLE's theorem, the entire subject of multiple periodicity with its impact on the theory of algebraic functions and their integrals, may be recalled to mathematical readers. If some of these great monuments of nineteenth century mathematics are already receding into the mists of yesterday, we need only remind ourselves that PICARD's theorem on exceptional values in the neighborhood of an essential singularity, one of the most suggestive in current analysis, was first proved by devices originating in the theory of elliptic functions." (p. 335).

"Since HERMITE's time many numbers (and classes of numbers) have been proved transcendental. What is likely to remain a high-water mark on the shores of this dark sea for some time may be noted in passing. In 1934, the young Russian mathematican ALEXIS GELFOND proved that *all* numbers of the type a^b, where a is neither 0 nor 1 and b is *any irrational algebraic number*, are transcendental. This disposes of the seventh of DAVID HILBERT's list of twenty three outstanding mathematical problems which he called to the attention of mathematicians at the Paris International Congress in 1900." (p. 463).

These quotations are sufficient to illustrate the value of BELL's book

for mathematicians. It will help them to reconsider their knowledge from a different angle and to tie a few more knots in their memory.

The author had it in him to write a book of permanent value; he preferred to write one that would sell right away. This reminds me of a sentence of his (apropos of GAUSS !) "He stretched forth his hand and plucked the Dead Sea fruits of a cheap fame in his own young generation", and it reminds me also of a much older saying "Receperunt mercedem suam, vani vanam". GEORGE SARTON

Mary Proctor, F. R. A. S., and Dr. **A. C. D. Crommelin**, B. A., F. R. A. S. — *Comets. Their Nature, Origin, and Place in the Science of Astronomy*, XI + 204 pp. London, The Technical Press Ltd., 1937.

There can be no doubt of the qualifications of Miss PROCTOR and Dr. CROMMELIN to write on comets. They are authorities on the subject. However, it is doubtful whether this little book does them credit.

The book as a whole is interesting and up to date, but a short perusal of the table of contents gives early warning of the book's discontinuity. There are eight chapters, as follows : "I. Whence come the Comets, and what is the Origin of the Comet Families of the Giant Planets? II. PONS, Famous Comet Hunter III. Comet Pons-Coggia-Winnecke-Forbes. By Dr A. C. D. CROMMELIN IV. The Story of Halley's Comet V. Return of Halley's Comet in 1910 VI. JOHN RUSSELL HIND, in Connection with his Work on Comets; and the Story of Encke's Comet and Biela's Comet VII. Pioneer Comet Hunters: TEBBUTT in N. S. W.; DENNING in England; REID and FORBES at the Cape; and E. E. BARNARD in U. S. A. VIII. The Capture Theory of Comets. By R. A. PROCTOR."

As the preface foretells, the authors assert that the capture theory of comets is not tenable. In the 19th century RICHARD PROCTOR argued against that theory. Now, his daughter and Dr. CROMMELIN uphold his reasoning. In *Comets*, they reprint an article on the "Origin of Comets" by PROCTOR, which had originally appeared in 1884, and another by CROMMELIN on the same subject written in 1910 with an addendum written in 1935. These reprints are prefaced by a quotation from an article by CROMMELIN which appeared in *Nature* in 1931.

The information concerning an ellipse which is given at the end of the second chapter is just tacked on. It could much better be given at the beginning of the book, and it could be simplified by first defining an ellipse and then illustrating the definition. The ellipse is not peculiar to the orbit of the comet Pons-Winnecke to which the second and third chapters are devoted.

The chapter on comet hunters has many excerpts from the writings of the men under discussion. The short notes on PONS, COGGIA, WINNECKE and CLAUSEN repeat some of the information given when discussing the comets they observed. This is especially true of the remarks concerning PONS, much of whose work is described in the second chapter and again in the third and seventh.

Comets is in great part made up of quotations from previously published articles and books by various authors, strung together by connecting sentences. The same information could have been given and the same authorities credited with it, had these exerpts been rewritten to make a continuous narrative. The effect that has been given is one of splotchiness. One cannot but feel that the able authors might profitably have spent a little more time in preparing their book.

It seems strange to an American reader that a chapter can be written on Halley's comet in its 1910 appearance without reference to BOBROVNIKOFF's two-volume work on the subject.

There is a good index at the back of the book and there are interesting illustrations dispersed throughout. These illustrations include, among others, a photograph of Halley's comet in 1910, a sketch by PONS of a comet in 1808, a diagram of the orbit of comet Pons-Winnecke, and a diagram of the motion of the comet of 1625.

The volume gives a good glance at the fields of cometary history and cometary theory. Despite its many faults it affords interesting reading. It tells much of what has transpired since the publication of PINGRÉ's monumental two volumes.

(*New York*) C. DORIS HELLMAN

Francis R. Johnson.—*Astronomical Thought in Renaissance England.* A Study of the English Scientific Writings from 1500 to 1645. xi+357 pp. The Johns Hopkins Press, Baltimore, 1937. $ 3.25.

The present volume gives us added reason to be grateful to Dr. JOHNSON for his contributions to the history of science in Renaissance England. Particularly helpful is the wealth of biographical and bibliographical data, with the latter including, as Appendix A, " A Chronological List of Books Dealing with Astronomy Printed in England to 1640." The book is a skillful blending of recently gathered material, published articles, and MR. JOHNSON's doctoral dissertation (1935), portions of which the reviewer had the pleasure of reading at the kind invitation of the author. The early chapters provide the necessary historical background for sixteenth-century cosmological thought, and where secondary evidence is required, have utilized such standard and substantial works as those of DREYER, SARTON and HEATH. These early chapters,

particularly chapter III, touch upon or discuss cosmological and related thought in Britain, but it is with chapter V, " The Advancement of Astronomy in England " that Dr. JOHNSON definitely concentrates upon demonstration of the too often neglected point that England as well as the Continent had important pioneers in what we may call the " new philosophy."

In this fifth chapter the author makes commendable additions to our knowledge of the achievements of ROBERT RECORDE and JOHN DEE, the latter of whom, as the reviewer has observed, was not infrequently mentioned with favor by his continental contemporaries. Because of Dr. JOHNSON's command of the field and his intimate knowledge of RECORDE's thought and work, the reviewer had hoped for discussion of two summary captions in the *Castle of Knowledge* (1556, p. 285), which seem difficult to reconcile with the received interpretation that RECORDE was a Copernican : " 11. That the earthe is the middle of the worlde, and the contrary opinions repeated and confuted by sondry proofes. 12. That the earthe dooth not move from the centre of the worlde." In the analysis of the scientific thought of JOHN DEE, a suggestive connection is made between this thought and Platonism, a valuable reminder of the fact that in the sixteenth century science and philosophy were more often than not inseparable companions.

The major portion of the succeeding chapter is familiar to the many readers of Drs. JOHNSON and LARKEY's " Thomas Digges, the Copernican System, and the Idea of the Infinity of the Universe in 1576," and requires no comment. Subsequent to analysis of the contributions of DIGGES, whose important rôle in the second half of the sixteenth century was decidedly underestimated prior to the work of JOHNSON and LARKEY, the author points out that there existed in England active advocates of the anti-Aristotelian doctrines of PETER RAMUS. The influence of the Ramist group, which Professor C. M. COFFIN discussed briefly in *John Donne and the New Philosophy* (1937, pp. 36-37), has I believe, been too generally overlooked by historians.

Among the difficult problems which the " new astronomy " brought to the sixteenth century, one of the most troublesome was that of providing physical confirmation of the motion of the earth. The first important English scientist to labor energetically with this problem was WILLIAM GILBERT, and both he and his followers are fittingly discussed at some length. Dr. JOHNSON finds in GILBERT's conception of the universe as infinite the influence of ideas presented in DIGGES' *A Perfit Description of the Caelestiall Orbes*. Without differing from Dr. JOHNSON, the reviewer believes that the influence of *De Revolutionibus* should be taken into account, for where COPERNICUS had written " *mundus, cuius*

finis ignoratur, scirique nequit", GILBERT, in presenting the same argument for the earth's rotation, wrote: "*mundus, cuius finis ignoratur, scirique nequit.*" It is possible, but rather improbable, that GILBERT would, by translating DIGGES' translation, "the whole world (should sway and turne), whose ende we know not, ne possibly can of any mortall man be knowne", utilize precisely the words and sequence of COPERNICUS.

In his *History of the Planetary Systems* (1906, p. 416), J. L. E. DREYER made the important point that "about the year 1630 nobody, whose opinion was worth caring about, preferred the Ptolemaic to the Tychonic system". Despite the truth of DREYER's statement, we have generally continued to contrast Ptolemaic and Copernican. Because of this fact, not the least of Dr. JOHNSON's contributions is his final content chapter, "The Two Chief Systems of the Universe: The Tychonic and the Copernican". In this chapter he shows conclusively the dominant position held by geo-heliocentric astronomy, and accurately remarks that "The progress of COPERNICUS and TYCHO and the downfall of ARISTOTLE and PTOLEMY are nowhere better illustrated than in the popular almanacs". In the concluding pages of the chapter, as in the earlier dissertation, Dr. JOHNSON makes the valuable point that scholars "who support the view that MILTON was deeply learned in the astronomical science of his day", must explain why the poet failed to discuss the Tychonic system. This point, one which was first announced publicly in the dissertation, is altogether in harmony with the reviewer's observation that a writer who seriously discussed in 1663-1665 the *triple* motion of the earth had not followed the development of technical astronomy after 1630.

We should be grateful to Dr. JOHNSON for his substantial volume. As is the custom of scholarship, there doubtless will be different and at times conflicting interpretations of the evidence discussed. The book will remain, however, a genuine contribution, and in many ways justifies its author's prefatory description as "the first pathway to be cut through the unmapped wilderness of English scientific works."

Smith College. GRANT MCCOLLEY.
[*Northampton, Mass., U. S. A.*]

Mario Gliozzi.—*L'elettrologia fine al Volta.* 2 vols. 290 p.; 233 p. Napoli, LOFFREDO, 1937.

The founding of the science of electricity has met with difficulties which can be compared without exaggeration to those which beset the birth of dynamics and of chemistry. The unity of science was more a unity of faith in the Founding Fathers. Electrology had to work out its own salvation: for very few of the ideas developed by GALILEO

could be transferred to the new field, if we except the confirmed belief in the principles of experimental rationalism.

We have to thank Professor GLIOZZI for not giving us a history of mere facts, but for bringing to bear a very intelligent notion of the value of method (vol. I, p. 291) and for having searched painstakingly for the intellectual motives which prompted the successive phases of electrological research. His scholarship, which may strike at first as somewhat hazy in the section concerning antiquity, becomes increasingly sound as soon as the Renaissance is reached, until it attains its best in the treatment of the XVIIIth century. A most difficult period, but one for which the author was well equipped, as witnessed by some remarkable pieces of original research published in *Archeion*.

Although much of interest may be noted in the foregoing period, a real science of magnetism and electricity begins only with WILLIAM GILBERT (1600). But it is an early and cold springtime. It precedes GALILEO's main work by some years ; yet it is not followed by any notable development until late in the XVII century. The approach of the Italian school, if we accept CASTELLI's brilliant but inconclusive essay, does not go beyond shrewd experimentalism. And we must wait until well into the Newtonian period before some consistent theoretical image of electricity is formed.

This is due to the baffling and misleading characters both of electricity and magnetism, to which few if any of the new mechanical concepts could be applied. These two elusive forces (which, by the way, were clearly distinguished only by CARDAN) seemed to justify, if anything, the old traditional views on sympathy, cosmic harmony and occult qualities. They lent themselves only too easily to any kind of representation. GILBERT had to find a place in his theory for the obviously attractive forces observed—and this brought him perilously near to plain animism. To him the magnetic flux is non-material : it is rather " the harmony of parts in the whole, of the fragments of globes to their unity."

It is a strange play of cross purposes to see GILBERT sternly rebuked by GALILEO for having attempted a magnetic explanation of the cohesion of the earth, while GALILEO himself vainly tries to explain tides kinematically.

We have here a striking instance of the brave struggle of Democritean atomism to overcome all obstacles singlehanded. However insufficient its equipment, it had to do or die : for with it, the Galileans thought, went the whole hope of a rational science. What to LUCRETIUS had been mere dallying with ingenious explanations becomes to them bitter earnest. To explain everything in terms of extended matter and motion

was a nigh desperate task; yet they would have said, as LAMARCK was later to say about evolution, that it was the only doctrine "qui tout en accablant l'imagination n'effraie pas la raison." Hence twists and turns innumerable, and the most arbitrary figments freely used, that only "reason" should be contented. GILBERT himself had drawn attention to the physical preposterousness of the particle-currents and vortices which were expected to produce all of the magnetic phenomena and yet show nothing of their gaseous aspect. But the dogma of materialistic explanation does not shrink from material absurdities. GALILEO insisted on vortices, DESCARTES improved on the idea with an astonishing double system of screwlike particles, clockwise and counter, which were to find in magnetic matter pores of corresponding screwlike bore. As to the experimental fact of attraction, it was currently explained through the action of the medium, thus providing an unexpected resurrection of Aristotelian ideas. The physicists who complained of philosophers were trying at the same time to borrow their worst physics. DESCARTES at least was square about it. Let us recall his animistic explanation of weight (in a letter to princess ELISABETH), a hopeless admission which might have spared him the pains of his electrical theory.

This state of things continued for a long time. BOYLE reacted sharply against the dangerous trend, and so did GUERICKE; but they still had to think in terms of hooked and barbed particles. BERNOULLI, HAUKSBEE, GRAY himself cannot get beyond this orthodoxy. Yet, GRAY had gone far towards clearing up the question experimentally by discovering insulation (1729) and electrostatic induction (he still mixed them up, however); but his many happy finds were bound together more by a general intuition than by method. This intuition is voiced shortly after by DU FAY: everything, including metals, must be electrisable, it is only a question of conduction.

But the very mass of experimental material by now available was confusing. The puzzling behavior of light bodies under electric forces seemed to stultify all efforts towards a Newtonian interpretation, and to lead back invincibly to the old idea of vortices. It took DU FAY's daring and simplifying imagination to overset all obstacles and reduce everything to simple attraction and repulsion, with the proviso that two different kinds of electricity were involved.

Up to this time, electricity is still "caviare for the general." It enters public notice with the Leyden jar (1745) and the startling if painful surprises contained therein. Shortly after, FRANKLIN brings it into the focus of fashionable attention.

FRANKLIN's story shows a mind somewhat akin to MARCONI's in our

own day. His scientific unconventionality inverted the natural line of thought, and went straight for the application. He did not just look for the analogy with atmospheric electricity: he wanted to harness thunder. From the resulting crop of facts electricity emerged in its modern aspect. Yet how far still was the goal of a comprehensive system. Such a simple theory as that of the condenser took almost a generation. Mathematicians like AEPINUS and the great CAVENDISH are frustrated in their attempts towards a theory of which they had already a model for gravitation: and it is only the discovery of the distribution of signs in static induction by AEPINUS which brought the decisive blow to the idea of electric "atmospheres."

But we cannot pursue this analysis, and we are conscious of not having done justice to the complexity of electrical research and to the many sidelines investigated by Mr. GLIOZZI. Nor does space allow us to dwell on the culminating controversy between VOLTA and GALVANI. Although it has been discussed many times (e. g., *Isis* 15, 124-57), this new first-hand analysis is far from useless. It throws light on the old re-enacted drama of the biological vs. the physical point of view.

Now for the weak points. For the main one the author cannot be held really responsible: it is rather the general problem of the poor blending of the scientific and the humanistic tradition in the modern curriculum. In one case, to say nothing of style, if the author had been better acquainted with the instruments and result of historical criticism, we doubt whether he could have found his way to important ideas and significant complexities. History of science is entitled by now to an exacting standard. Hence some naivetés which might otherwise have been pleasant become disturbing; thus an XVIIIth century Jesuit like G. B. BECCARIA is lauded for enjoying VIRGIL "in the original"; thus also the author finds it necessary to defend at length the XVIIIth century from the reproach of utter decadence. FRANKLIN is treated to a place of unique pre-eminence with a biography reminiscent of the gaudiest and fearfullest color-prints.

May we add a few topical remarks. On p. 20 and 21 of vol. II we are given incompatible statements on CAVENDISH's measures of resistance. There are a few mistakes in the translation of foreign terms, e. g., GILBERT styled a "physicist" to the Queen instead of a physician, vol. I, p. 156; names left in their foreign equivalents such as "achate," "iaspis," ib. p. 67; and misprints are profuse.

On the other hand, we should like to point out some original contributions: to FONDE is given back MELSEN's lightning-rod, and BECCARIA is indicated as the real originator of KINNERSLEY's electric thermometer. CAVERNI's misleading valuations are held up to fresh

criticism; and what is perhaps more important, GILBERT's famous *versorium*, which is considered by many to mark the beginning of electrical experimenting, is traced back to FRACASTORO.

G. DE SANTILLANA.

C. E. Britton. — *A meteorological chronology to A. D.* 1450. 178 p. folio. (Meteorological office, Geophysical memoirs no.70, first number, volume 8). London, His Majesty's Stationery Office, Adastral House, Kingsway, London, W. C. 2, 1937 (8s.).

This is a splendid publication which deserves to be far better known than government publications generally are. The author has given us for the British Isles a list of meteorological phenomena, which will be a solid foundation for all ulterior work on the subject. It belongs to the same class of studies as ALFRED ANGOT (1848-1924) : *Premier catalogue des observations météorologiques faites en France depuis l'origine jusqu'en* 1850 (Paris 1897), RUDOLF HENNIG : *Katalog bemerkenswerter Witterungsereignisse* (Berlin 1904), ÉMILE VANDERLINDEN : *Chronique des événements météorologiques en Belgique jusqu'en* 1834 (Bruxelles 1924), CORNELIS EASTON : *Les hivers dans l'Europe occidentale* (Leyde 1928), PAVLE VUJEVIĆ : *Documents historiques sur les variations de climat* (Beograd 1931), and supersedes all anterior investigations relative to the British Isles. I find nothing but praise for BRITTON's work, nothing to criticize except his terminal date, A. D. 1450, which is perhaps too arbitrary. The author says "it represents a convenient end point as it coincides with the era of the invention of printing and the beginning of a definite expansion in the sources available for examination." What does the invention of printing matter? What matters is the beginning of printing in England in 1477. However this is a minor criticism, which the author may easily nullify (as I hope he will) by publishing a sequel relative to the years posterior to 1450.

The best way of indicating the author's purpose and method is to quote from his own preface :

"A number of writers have made compilations of historical references to the weather of the British Islands. Probably the best known, although not the most extensive, of these works is that of E. J. LOWE which appeared in 1870 under the title '*Natural phenomena : and Chronology of the seasons.*' It is little more than a list of events arranged in chronological order although details are occasionally given in amplification of the entries. The first of these compilations which is of any importance is that of THOMAS SHORT (c. 1690-1772) of Sheffield who, in 1749, published in two volumes his '*General chronological history of the air, weather, seasons, meteors, etc.*' The preparation of this immense work occupied the 'indefatigable doctor' for about fifteen years and it is certainly the most extensive research of its kind in any language. Its faults are as great as its merits

and a discussion here of both the good and the bad aspects of the work will serve to give an outline of what has been attempted in the present chronology. For a meteorological chronology to have its maximum value the attention of the compiler must be directed to two main points, dates and authorities. No events should be included as authentic that have not at least a *prima facie* claim to historicity, and the dates given for the events should be, as far as they can be ascertained, reliable. Both these desirable ends are served by careful citation of authorities and, where necessary, by discussion of the alternative datings given by the original writers and annalists who mention the events. It is here that the great weakness of Dr. SHORT's work is visible. He hardly ever cites an authority for his statements and he is frequently very light hearted in the matter of dates. In the result he gives us a vast compilation of events without any clue as to where and by whom the majority of them were recorded. Still more remarkable, there are numerous events mentioned, especially those purporting to happen in the first 1,000 years of the Christian era, which appear to have no foundation whatever in fact. Frosts, floods, droughts, storms and other phenomena appear of which it seems impossible to find any mention in history until they appear in Dr. SHORT's treatise. Very careful search has been made to find out some earlier source for such notices but they nearly all appear to be quite unknown to authorities in our national and county history. All such entries are probably quite fictitious and it would be very interesting to know where the doctor acquired this mass of unhistorical information. It is clear that had he taken the trouble to indicate the authorities for his statements the historicity or otherwise of all these events could have been critically discussed and much erroneous matter would have been kept out of later compilations. Similar troubles arise over dates. Our early historians do not always concur among themselves as to the dates of events of major historical importance and it is, therefore, not surprising that meteorological occurences are variously dated in the original writers. The mere uncritical copying of events from the histories has resulted in a vastly swollen list merely because the same event has appeared under slightly different dates in different historians. Such results occur again and again in Dr. SHORT's work. It is not uncommon to find the same occurrence scheduled as many as three times under different dates, sometimes with ludicrous results, as when a particular year is described in one paragraph as wet and in another as dry. Had original authorities been cited, the matter could have been straightened out, to a considerable extent at any rate." (p. 3).

"In discussing changes of climate in the historical period one of the founts of the necessary material is the literary. It is hoped that the present work will help to make this part of the data more reliable. It cannot, of course, claim to be final in the sense that everything ascertainable has been included but it is hoped that very little of importance has been missed. Perhaps also some light will eventually be shed on the origin of many oft-quoted events, like the great frost of A. D. 220, the Thames floods of A. D. 9, *et hoc genus omne*. These continually appear in print but no one has ever vouchsafed any information as to who first placed them on record." (p. 5).

The chronology is divided into ten periods as follows : I. Traditional (from B. C. 2668), II. Roman (from B. C. 55), III. Saxon (from c. 450); periods IV to IX are each one century long, from the ninth to the fourteenth; period X, extends from 1400 to 1450. I have examined with

particular care the notes relative to the fourteenth century (p. 131-53) and was very much pleased with the excellent arrangement of well polished materials.

This very useful book is completed with a bibliography of similar writings from 1749 to 1928 (with critical notes), a list of histories, chronicles and general works consulted by the author, and an index of the more noteworthy meteorological events. That index might have been expanded. It only includes the years of severe winters, heavy snows, marine floods, years with notable wet periods, years with notable dry periods, hot summers. I would have liked to find, e.g., the years when northern lights were observed (1) and other data of the same kind. The lack of an index of authorities and other persons is regrettable.

This is one of the best historical publications issued by His Majesty's Stationery Office; its value is great and its price very modest. We hope that this meteorological chronology may be continued with the same care down to our own days.

GEORGE SARTON

Walter Cline. — *Mining and Metallurgy in Negro Africa.* Pag. 155. General Series in Anthropology No. 5, Menasha, Wisconsin, Banta Publishing Co., 1937, ($ 2.00).

In the preface to this valuable monograph the author remarks that "The rage for psychology and sociology which has affected anthropology within the last fifteen years has brought, among numerous blessings, two very insidious evils. At a time when the coordination of archaeology and ethnology was beginning to be most productive, this new trend has widened the gap between the two disciplines, and has convinced many younger spirits that the fields of historical research which anthropology has only begun to clear and cultivate have already been exhausted.

"Furthermore, it has encouraged an indifference to literature — not only to the professional literature of anthropology, but to the more naive and often more honest sources in early geography and travels. Young anthropologists are not bookish enough anyway; they want to go on trips. They naturally welcome the suggestion that the existing data are not good enough to use, and that what we really need is 'original field work.' This assumption is largely true. But a field job in ethnology almost invariably produces an account of one particular culture. It

(1) Compare the investigation made by D. O. SVIATSKIJ : Aurora borealis in Russian literature and science from the 10th to the 18th century. (*Archives of the history of science*, vol. 4, 47-67, 1934). In Russian, analyzed in *Isis* 24, 282.

seldom illuminates a large set of cultures or a broad area; and the modern tendency to use less and less 'comparative material'... is retarding our progress very badly."

I am not sure whether Dr. CLINE intended these statements to be taken too seriously, but he is certainly right in breaking a lance in the cause of more archaeologists. It is a fact, however, that there are more students of archaeology to-day actively digging than there have ever been at any previous period, but it is also true that these are negligible in number when one reflects upon the vastness of the inhabited globe and how little it has been archaeologically explored. Still, the archaeological evidences of man's cultural development in different parts of the earth will keep, his living cultures will not. The inherent urgency of certain kinds of material have a commanding imperativeness about them which other kinds of material do not possess. This imperativeness must be respected and obeyed. The rapidly dwindling number of primitive cultures is a phenomenon which from the intelligent student's viewpoint is best dealt with by a field trip, and I think he is right, and Dr. CLINE for the most part thinks so too. Let us gather our facts before it is for ever too late. A large number of such facts are already irretrievably lost, shall we allow those that still remain to be gathered to sink into oblivion because in the opinion of some not enough of us are engaged in comparative studies? Comparative studies? Surely there is time for these? The fact is that there are far from enough students available to do the job at all satisfactorily of collecting the facts. How often is the anthropologist compelled to sigh with regret "Alas, we know so little about those people", or, "I wish I knew something about those people", either because they are inadequately known or unknown altogether anthropologically. In anthropology, as in other sciences, facts are worth more than theories, and where the facts are still obtainable in large series, surely it were hardly wise or scientific to deprecate, even by plausible implication, the activity of informed fact collecting in anthropology. Of course, comparative studies are desireable; I like nothing better than the reading of such studies in anthropology, but then I regard such an activity as a luxury, and though facts may be drier (even Dr. CLINE cannot avoid apologizing for what he unnecessarily speaks of as the dullness of his study) they are, in the present stage of the development of the science of anthropology, of more vital importance than generalizations. The more facts we gather into our net the better will our comparative studies eventually be and the sounder our generalizations. Under a dictatorship one could easily "persuade" parents to dedicate a son to archaeology and another to anthropology, just as in certain countries one son used to be dedicated to the Church and another to the

Army, hence the only solution I can see for Dr. CLINE's problem is in a dictatorship; but who wants to live under a dictatorship? Such studies as Dr. CLINE commends might be frowned upon unless, for example, they were carried on under the banner of MORGAN, because MARX happened to have lived and thought when MORGAN was making his discoveries, or unless they were limited to strictly Aryan fields. In what remains to us of our own civilization broad syntheses of existing knowledge will always be valuable and in the present volume Dr. CLINE has given us such a most excellent synthesis of the existing data relating to mining and metallurgy in Negro Africa.

Mining and metallury are activities which are so closely related to the development of society and of civilization, and to the development of early sciential processes, that a survey of these activities, particularly as practised in Negro Africa, such as Dr. CLINE offers us is particularly to be welcomed.

Dr. CLINE devotes his first chapter to a review of the processes of handling gold throughout Negro Africa, first because gold provides the historical background for foreign contacts, and second, because "it is convenient to get a minor and somewhat separate subject out of the way" before going on to a consideration of the essential parts of the metallurgical complex. What we had thought would have been the more cogent reason for beginning with gold Dr. CLINE does not even mention, that is, that it was probably the first metal to be mined and used in Africa. The surface occurrence of gold and its easy malleability would suggest as much, even though the evidence is unclear. Dr. CLINE however, does notice that gold flowed out from the Negro borderlands in very ancient times, and that as early as the Sixth Dynasty it was coming down from the Upper Nile districts. Dr. CLINE states that it was not until the Middle Ages that the gold trade from the real Negro area assumed large proportions. This statement is open to some doubt. There can be no question that Mediaeval European exploiters helped to increase the volume of the trade in gold, but there is very good reason to believe that already in the days of HERODOTUS the trade was a lively one. "The mediaeval history of the Western Sudan could be written largely in terms of gold and salt", writes Dr. CLINE, but so, too, could the ancient history of the same region.

The methods of mining gold in Negro Africa appear to have differred in different places, but surface panning and digging were common methods. It is interesting to learn that in the 12th Century the natives of West Africa are said to have used mercury to dissolve the small particles of gold out of the dross, and that the amalgam was distilled over a charcoal fire until the pure gold remained. But, alas, Dr. CLINE is

doubtful whether in this case his authority actually meant West Africa, and not Morocco or Algeria.

The old Arab belief in vegetable gold growing as the roots of plants, roots and minerals both being products of the earth, is discussed, and a persuasive explanation is offered for the origin of the belief.

Among the Galla of East Africa we discover that gold and silver working was learned from the Arabs. On the Lower Shire it has been claimed that the Portuguese taught gold casting to the natives, and that the worked Manyanja and Yao obtained gold for the Portuguese, but probably very little for themselves. Everywhere, indeed, the natives seem to have valued the metal as an object of exchange or barter, rather than as a material to use for their own purposes, but that some of it was so used is certain, as Dr. CLINE makes clear.

While Dr. CLINE gives the distribution of mines, he appears to have been able to collect very little information on the manner in which the miners worked, or of the detail of the mines. The miners panned, dug, and sank shafts; in West Africa to-day the men do the digging and the women the panning. Many of the ancient mines are quite deep and the underground workings often extensive.

Of silver Dr. CLINE states that it was "probably never smelted, and very rarely worked, in the indigenous Negro cultures, and early reference to this metal seem to indicate no more than its discovery and exploitation by foreign pioneers". (p. 16). In spite of his negative evidence is it not possible that the mining of silver was practised in Negro Africa before the advent of 'foreign pioneers'?

In his second chapter Dr. CLINE deals with *Negro iron-working in Antiquity*, and considers first the archaeological record. Dr. CLINE is unable to accept DART and DEL GRANDE's estimate of 4000 years for the antiquity of the iron smelting furnace found in Mumbwa Cavern in southeastern South Africa. His analysis of the evidence is convincing, and although it is impossible to date this furnace deposit exactly, Dr. CLINE thinks it is very old, though not as old as DART and DEL GRANDE thought. Anything between a thousand and two thousand years may cover the age of the deposit. The iron deposits at Zimbabwe give as the minimum dating for the beginning of iron working in Southeast Africa the 8th Century A. D., but as Dr. CLINE points out, the "Iron Age" was by that time already well advanced.

From Dr. CLINE's analysis of the existing data it is evident that a great deal of archaeological work will have to be done in Africa before we will be in a position to venture any reasonable account of the early working of iron in Negro Africa. Whether the Egyptians obtained iron from

Negro sources is not certain, though it is possible; here the Egyptologists are invited to lend their assistance.

The historical record relating to the use of iron in Negro Africa does not extend beyond the 11th Century for the Sudan, but for East Africa there is some evidence that in the First Century of our era iron was imported from Ariaca in India, and traded with other Indian goods into Abyssinia, and of the importation from Arabia of lances made especially for this trade. In the Middle Ages, however, iron flowed eastward instead of westward, and the trade in it appears to have been a substantial one.

Dr. CLINE suggests that the beginning of iron-working in East Africa should be placed at some time between the 6th and 12th centuries, and he ascribes this beginning to the stimulus of trade with India, Arabia, and Ethiopia. "This would allow a century or more for the growth of iron-working at Zimbabwe, and might even cover the Mumbwa case..." (p. 21).

In a very interesting section on the *Native traditional record* Dr. CLINE traces the 'evidences' from native traditions concerning the development of iron-working. Dr. CLINE is no Euhemerist, and the conclusions he draws from an examination of the traditions are reasonable; these are, that the northern Congo and central and western Sudan form a relatively old iron-working area, and that in the rest of Africa, with the exception of parts of northern Rhodesia, iron-working is relatively late.

In his third chapter Dr. CLINE surveys *The modern distribution of iron-working and mining in* Negro Africa. The processes of mining and panning for ore are here described, and a valuable table is appended showing the kind of ore mined, where, and by what tribes. The Bushmen, the Pygmies of Equatorial Africa, and the peoples of the Island of Fernando Po are the only cultural groups in Negro Africa who know nothing of iron-working.

In an excellent fourth chapter Dr. CLINE discussed *Iron smelting* techniques. A comparative table giving tribe or place, type of furnace, bellows, charge used, etc., helps the reader to see at a glance what kind of smelting process is used by any of the tribes dealt with, and these are many. Native ore smelters though able enough did not, in general, produce a very good metal, a good deal of slag usually being entangled in the finished product. The aim of the native smelters seems to have been to produce "a soft steel not susceptible of tempering but endowed with a certain hardness — which allows the manufacture of sharp blades." (F. GAUD, *Les Mandja*, Brussels, 1911, 225-232). Steel seems to have been deliberately and fairly widely produced in Negro Africa; cast iron was very rarely produced, wrought iron somewhat more frequently.

Old workings for copper and tin in Southeast Africa is the subject discussed in chapter five, Dr. CLINE here recognizing the Transvaal, Rhodesia, and the Katanga region as a distinct metallurgical province, "characterized by the mining of copper, tin, and gold, the size and complexity of the mines, the use of smelting-fluxes, and the making of bronze". (p. 56). Since the early tin and copper mines appear to lie on the same horizons in this area, Dr. CLINE has preferred to consider them together in a separate chapter. While in these regions there are many old copper mines and tin mines, it is of interest to note that the present day natives possess very little copper and that still less tin is produced by themselves. A puzzlement is here also presented by the fact that relatively very few evidence of the manner in which the ore was treated after mining have been found. The suggestion that most of the ore was probably ground down for use as pigment does not find much favour with Dr. CLINE for the reason that here, in turn, there exists very little evidence, if any, that such an activity was ever engaged in in Negro Africa. The historical and ethnographical records relating to copper and tin date from the 15th Century but these contain no references to the use of ores as cosmetics, and, unfortunately, these throw very little light on the processes of mining and smelting which may have been used by the natives. Within the historic period there are definite evidences of intertribal trading in these metals, and there is a possibility, though much doubt hedges it about, that the Arabs did some trading here in tin in mediaeval times.

Copper in its general distribution in Negro Africa is considered in the fifth chapter. Dr. CLINE here points out that "Unlike Asia, Europe, America, and North Africa, Negro Africa has employed copper and its alloys almost entirely for ornamental purposes and as media of exchange." A fact which favours the belief that Negro Africa passed directly from an Age of Stone to an Age of Iron.

Many tribes of Negro Africa did not mine their own copper but imported it from neighbouring tribes, and there is good reason to believe that already in the 11th Century copper was being imported into "the land of the heathens" from Morocco by Arabs.

The information available on the smelting of copper among modern Negro Africans is not very full, but such as it is, Dr. CLINE makes good use of it. Methods differ in different places, but in general fired charcoal in a furnace, with or without bellows, is the usual process used in smelting the various kinds of copper ore. Among certain tribes small stone crucibles appear also to have been used.

Tin presents a special problem since, according to Dr. CLINE, only two tin-mining centres are known in Negro Africa, in the Transvaal and

the Bauchi Province in Northern Nigeria. The only account of tin smelting available comes from the Hausa of Liruen, and here the fired charcoal furnace is in use. This tin is traded over far distant parts of Africa by the Hausa.

In chapter eight, which treats of *Alloys*, — bronze and brass, — Dr. CLINE shows that not a single Negro culture ever learnt the secret of good bronze; copper, tin, lead and other metals being found in their bronze in haphazard proportions; copper-tin alloys in the standard proportions of nine to one have never been found; the ancient bronzes, which are of better quality than the modern, are of very doubtful origin.

Since Negroes rarely if ever mined zinc or lead, European or Arab trade must be held accountable for the presence of brass in Negro Africa. An interesting fact which Dr. CLINE does well to bring out is that the so-called Benin "bronzes" are not made of bronze at all, but are actually made of a mixture of copper, lead, and zinc, which therefore puts them into the class of brass.

In chapter nine the kinds of *Casting*, in chapter ten *The technique and equipment of the forge*, and in chapter eleven the *Types of bellows*, are described and their distribution discussed and presented in lucid tables. In chapter twelve *Wire and chain* making are similarly described and discussed. In all these chapters there is much of interest, and all assist greatly to clarify problems which future researchers must seek to solve.

In chapter thirteen an account is given of *The social and religious aspects of metal-working*. Here the varieties of attitudes towards smiths and the magico-religious beliefs associated with metal working are surveyed and discussed. From the great variety of these attitudes, ranging from contempt to the highest forms of esteem, it is very evident that the place occupied by the smith in any given Negro African group is determined by factors peculiar to the structure of each such group.

Dr. CLINE's final chapter is entitled *Speculations*, but since there is very little that is speculative in it, it might perhaps have been more justly entitled *Conclusions*. A bibliography of 310 titles and 4 key maps complete a work which must have cost much labour and which will be of permanent usefulness.

In this work it has been no part of Dr. CLINE's purpose to discuss the relations between the mining and metallurgical activities of Negro African cultures and other technological processes, but Dr. CLINE's work will be nonetheless valuable in any future study of the development of the technologies in Negro Africa.

New York University. M. F. ASHLEY-MONTAGU.

Paul Bergsøe. — *The Metallurgy and Technology of Gold and Platinum among the Pre-Columbian Indians.* Ingeniørvidenskabelige Skrifter Nr. A 44, Danmarks Naturvidenskabelige Samfund, København, 1937, (2 Kroner). Pag. 45.

This exemplary study, without any possible doubt, puts all other studies of a similar kind into the shade. It cannot be too highly praised, for not only is it a work well done, original, novel, enlightening, and important, but it is also thoroughly sound, eminently cautious, exhaustive in its method, and from every point of view an outstanding contribution to the story of the metallurgical and technological activities of early civilizations. Yet the work is in no sense elaborate, but is simplicity and lucidity itself, and though it covers a great deal this is achieved in the short space of 36 pages of actual text.

PAUL BERGSØE, who in this paper shows himself the possessor of an admirably clear mind, is the Vice-President of the Danish Association of Metallurgical Research, and a practising metallurgical engineer. Though nowhere is the statement explicitly made in this study, it appears that a few years ago BERGSØE visited Esmeraldas, La Tolita, and Atacames on the northern coast of Ecuador, where by archaeological methods and surface panning he recovered a large number of small articles, implements and trinkets, all of which had been worked in gold or platinum or both. Some 80 of these objects are figured in four plates. With the exception of four exquisitely wrought ones, all of these objects are of pre-Columbian age, but beyond saying this much the exact age of these objects cannot, at present, be determined.

The objects discovered at Esmeraldas comprise fishing-hooks, awls or eyleteers, tweezers for removing hair or picking up small particles of metal, nippers or forceps, clothes eyes, pins, safety-pins, sewing-needles, nails and tacks, spoons with handles formed like snakes, nose-rings, ear-buttons, skin-plugs (?), rings for fingers or toes, trinkets with loose hanging ornaments, pendants, minute beads, minute masks, and miscellaneous trinkets of unknown use.

At Atacames a unique safety-pin was discovered. This "pin fits into a closed guard or catch in a manner exactly similar to the safety-pins used in our hospitals to-day. The only difference is that the catch, instead of being placed at the end, is fixed to the side of the pin" (p.12). BERGSØE suggests that it may have been used to secure two clothes eyes, for nothing quite resembling clothes hooks for fastening eyes has been found. It is tempting to think that we have here a case of independent invention for this safety-pin is quite unlike any safety-pin from the Bronze Age to the present day with which I am acquainted ; such a

speculation would, however, be premature in the present diaphanous state of South American archaeology.

At La Tolita a considerable number of nails were discovered. In a few cases the head and body were of gold, but in most of these nails the body is made of copper and the head of gold. NORDENSKIÖLD found small bronze nails in a wooden handle recovered near Ica on the Peruvian coast, but elsewhere in South America nails are completely unknown; even to-day "nailing" is rare among the Indians of South America.

Much of the filigree and hammered work described and figured in these pages would command the unreserved admiration of the modern goldsmith, so exquisitely well is it made. The beads from La Tolita are really masterpieces in their own right. "The greater part of these beads consists of 6 tiny gold balls forming a circle and held in place by two little rings of gold wire, on above and one below... These beads being from two to four millimeters in diameter, it is obvious that we have a piece of work before us which demands almost inconceivable skill for its accomplishment." (pp. 15-16).

Having described the objects earlier named BERGSØE then enters upon a discussion of the results of the metallurgical examination of the material. One of the remarkable facts in this way revealed is that "*these people* (of La Tolita) *not only succeeded in obtaining platinum in coherent form, but were even acquainted with a method of using this platinum for plating other metals*". (p. 17).

Platinum, it will be recalled, was not known in Europe until about 1730, being first described by SCHEFFER in 1752, ** but it was not until the middle of the 19th Century that the problem of rendering the metal usable was solved. That the pre-Columbian Indians of La Tolita were able to bring platinum into a coherent and serviceable form, as is shown by an analysis of their "pure platinum", which actually turns out to be an *alloy* of platinum with some gold and a little of the silver naturally associated with gold, is an achievement of a remarkable order. How this was actually done BERGSØE has discovered and here tells. The process was quite simple, but it is one that is entirely new to metallurgical systematists. Interested readers must be referred to BERGSØE's original account where the story is briefly told. Had the Spaniards been less interested in the pursuit of gold and the extermination of the Indians, and paid some attention to the work of the people upon whom they had come like a scourge, the whole use of platinum in Europe might have

(**) There are a few earlier descriptions but only by a few years, see MARY ELVIRA WEEKS : *The discovery of the elements* (Easton, Pa., 1933, 99 ff.; *Isis* 21, 455). G. S.

taken a very different turn to that which it subsequently took. It is an interesting thought.

BERGSØE's metallurgical analyses, his discussion of the variety of technical processes used in the manufacture of these minute articles, his accounts of his own technical examinations of the material by spectroscopic, microscopic, and other means, and his brief discussions of the ethnological, archaeological, and historical problems involved, must always remain an admirable example to others of what can be done towards the elucidation of a people's cultural activities by a clear minded investigator.

I have given but a slight indication of the riches which are to be found in this short study, but I hope it has been sufficient to suggest something of its value. There is a brief bibliography. The translation by F. C. REYNOLDS is excellent.

New York University. M. F. ASHLEY-MONTAGU

J. B. Rhine.—*New Frontiers of the Mind.* Pp. 275, New York: FARRAR & RINEHART, 1937, ($ 2.50).

In 1935 Professor J. B. RHINE published a work entitled *Extra-Sensory Perception*, (Boston), in which an account was given of certain experiments carried out in the Department of Psychology at Duke University, from which it appeared that certain individuals were possessed of powers of mind of which science knows not and which science is alleged never to consider. The ability to perceive things without the apparent use of the five senses, that is, any one or more of the acknowledged five senses, Professor RHINE calls extra-sensory perception, or ESP for short. In the present work he gives a more detailed and more exhaustive account of his work and experiments than is to be found in the earlier volume.

The answer to the question "What is mind" used to be "No matter," and to the question "What is matter," it was more often than not, "Never mind." Today the distinction between matter and mind is less frequently made, the trend being all in the opposite direction. Mental functions and the functions of a brick wall tend to be regarded as much of a sameness, the mind and the brick wall functioning in their different ways owing to a difference in their molecular organization. But their elements fundamentally are of a similar structural character. BERTRAND RUSSELL, for example, has suggested the existence of a "neutral stuff" which organized in one way functions as matter, and organized in another way functions as mind. It is conceivable that just as different atomic organizations give rise to different chemical elements, so may such different organizations of physically irreducible ions give rise to the phenomena of mind and those of a brick wall. Students of the

Greek Atomists will recall that this was practically the position of DEMOCRITUS. Something of the Atomistic view of the world, which most physicists willy-nilly hold, no doubt explains the interest which so many eminent physicists have from time to time displayed in psychical research; and this is perhaps, as it should be.

It is of interest to note that like DEMOCRITUS in a similar connection Professor RHINE is concerned to show that " chance " (DEMOCRITUS' τύχη) cannot be appealed to as explanatory of such results as he has obtained by means of very simple experiments carried out under rigorously (?) controlled conditions in the laboratory. A student sits at some distance from Professor RHINE in an ordinary room. The latter holds a pack of 25 cards which the student cannot see; these are shuffled; no one knows their order. The pack of cards consists of 5 suits, each card in the suit bearing a symbol, a circle, a star, a plus sign, wavy lines, a rectangle, a square. Professor RHINE lays a card face down on the table. The subject is asked to state what the symbol on the face of the card is. The answer is recorded, and so on through the whole pack. Then the answers are checked against the face of the cards.

Seven years of such experiments with favourable subjects have yielded Professor RHINE the average of 6.5 hits out of 25. This finding is for Professor RHINE significant of the existence of some factor beyond chance which is here operative, for the chances that under ordinary circumstances an individual will pick up the correct cards in a pack of 25 are 5 to 25. Professor RHINE has a surplus of 1.5. Now, anyone with even an elementary knowledge of probability must agree that the 6.5 : 25 ratio is here significantly greater than would be expected if one were to take cards or balls of different kinds, in series of 25, out of a bag, or in the spinning of five-faced objects with thumb and fore-finger; but significant of what? Professor Rhine postulates some extra-sensory quality of the mind. What this quality is he does not know; that is something for further research to determine. Now, it seems to us that Professor RHINE's postulation of an extra-sensory quality of the mind to account for the extra 1.5 of successful " hits " is a perfectly gratuitous one. When he obtains 9 successful hits in a row, or on the occasion when he obtained a total of 25 correct hits out of 25 in one trial, what impresses Professor RHINE is the order of the odds against such a frequency of hits being obtained in any series of trials—5 to the 9th power. But strangely enough what Professor RHINE fails to realize is that in a sample say of 20 people chosen at random it would be possible to obtain the full range of correct hits on 20 first trials, and that though the odds against this actually occurring are of astronomical proportions, it is possible. Certainly it would be an

impressive experience. Probability, however, would by no means be adequate to explain what had happened here, all that it would give us would be an impressive statement of the chances of such a series of experiences ever occurring again. The probability against such a repetition of successes on a second trial would under ordinary conditions be tremendously great, but with the increase in the number of trials the positive probability would become increasingly great. Yet any individual chosen at random from a population could give a high frequency of consecutive successes in such experiments as were carried out by Professor RHINE, and all within the laws of probability. Thousands of others, we could easily predict, would not even rise to the 1 : 5 series of successes, such individuals would by Professor RHINE be called unsatisfactory subjects. Thus he writes, " If after calling through several decks of ESP cards, the subject failed to score much above the average of 5 right, which luck or chance would alone account for, the tests would be stopped. Sometimes unsuccessful subjects were asked to try again. More often they were not. The successful ones, those whose scores ran consistently above the level of 5 correct calls per deck, were eagerly encouraged and asked to continue with the work." (p. 61). Clearly, Professor RHINE was *very* selective. He wanted to find out not whether everybody, but first whether *anybody* possesses ESP. And here we see the great fallacy involved in all Professor RHINE's work. For what he appears to have done has been to select only such subjects as gave statistically high scores, and to attribute to them a quality which merely represents an arbitrarily attributed or derived function of the statistical scoring. In all this no *necessary* or *sufficient* relation is involved, but only a purely arbitrary one. As for the average findings of Professor RHINE, their significance will probably be found to lie in the particular conditions of the experiments. If a few of the cards had been taken out of the deck used in the experiments and cards bearing unknown symbols substituted, would the subject ever have " hit " any of these cards correctly? When an individual knows the symbols he may guess the right one, but when he doesn' twhat is the likelihood of him guessing them? Surely, if extra-sensory faculties exist, then they can have little meaning unless they are capable of perceiving existents the nature of which has not previously been disclosed, that is, at the time of an experiment. Professor RHINE's experiments in pure telepathy suffer from the same defect in that the symbols used were known to the subjects. Professor RHINE does not consider such absence of substitute symbols a defect of his experiments. But this is not merely a matter of opinion, but a question of scientific method, for if it was sought to discover whether the results obtained were due to anything

more than probable patterns of statistical scores, then the omission of undisclosed symbols from the packs would hardly provide the necessary conditions for such a test.

The reviewer is well aware of the inadequacy of the present review of Professor RHINE's very interesting book; he offers no apologies. A proper examination of Professor RHINE's work would demand considerably more space than we can give it here. But it does seem clear to us that a vast number of factors were involved in Professor RHINE's experiments which have been given no consideration by him at all. It is in the proper analysis of these factors that we would suggest that at least part of the answer to Professor RHINE's question lies. The personality of the subject, his habitual modes of thought, his individual history, his health at the time of the experiment, the light in the room, the air, the immediate environment, the interest of the subject, and numerous similar factors. These were all conditions of the experiments. Were any of these *necessary* conditions? The combination of which of them, if any, was *sufficient* to give the significant results obtained by Professor RHINE? Or were there factors involved outside and beyond these? Professor RHINE has obtained an apparent effect, but an effect of what, extra-sensory or sensory perception? The latter seems vastly more likely than the former.

New York University. M. F. ASHLEY-MONTAGU.

Henry B. Collins, Jr.—*Archeology of St. Lawrence Island, Alaska.* xi + 431 pag., 84 Plates, 26 Figures. Smithsonian Miscellaneous Collections, vol. 96, No. 1, Publication 3411, Washington, Smithsonian Institution, 1937.

The problem of the Eskimo and his culture and the problem of the peopling of America are closely connected ones. The most generally accepted theory of the present day is that North America drew its first inhabitants from Asia by way of Siberia across Bering Strait, possibly when north-eastern Siberia was connected by a land bridge with the Alaskan mainland. Bering Strait is to-day quite a shallow channel, and when the Strait freezes over it is possible to travel across the ice, and by the aid of floes, from the Russian to the American side and back again. On a clear day the coast of the opposite side can be made out with the naked eye. The distance from the Siberian to the Alaskan coast is some 60 miles. The physical and cultural affinities between the Siberian and the Alaskan are so great, and these are of such a kind, that there can be no doubt of the origin of the Alaskan Eskimos, and ultimately, as we pass southwards, of the American Indian. The " no doubt " is merely a matter of a high degree of probability, but not of

certainty. The possibility of Melano-Austral immigrations from the Pacific has hardly yet received the serious consideration which it deserves.

Mr. COLLINS does not discuss these matters, but takes them for granted. In the present work he is actually concerned with the problem of the Eskimos and of Eskimo culture, his volume representing a contribution towards the clarification of these problems. The volume opens with an historical introduction relating to the origin of the Eskimo and his culture, followed by a detailed account of the archaeological findings on St. Lawrence Island, the fruits of investigations carried out there, and also at Punuk, by the author and his assistants during the summers of 1928, 1929, and 1930. St. Lawrence Island, which is the largest island in the Bering Sea (about 100 miles in length), lies 150 miles below Bering Strait, 100 miles from the mainland of Alaska, and 40 miles from Siberia. In view of its position it had been reasonable to suppose that the archaeology of this island might throw some light upon the problem of the Eskimo and Asian-American relations. Mr. COLLINS, in the present publication, shows that such a supposition is supported by the archaeological findings. The latter are for the most part illustrated in 84 plates and a number of text figures, and are admirably described in the text. The material discovered and studied by Mr. COLLINS is not of a nature which permits him to solve any of the great problems, but it does enable him to clarify a good many points. It is quite clear from his findings that the origins of Old Bering Sea culture as represented on St. Lawrence Island are to be sought in the cultures of north-eastern Siberia.

The so-called resemblances between Old Bering Sea art and Melanesian art to which JENNESS has called attention are here disposed of by Mr. COLLINS as being due to convergence. This is, of course, a possible explanation, but until much more of the evidence is in it were better to suspend judgment and to bear the possibility of such a relationship in mind, however unlikely it may at the present time appear.

The resemblances which Mr. COLLINS sees between certain aspects of Old Bering Sea art and the early Chinese art of the Shang (yin) and Chou dynasties (1766-255 B.C.), chiefly the elliptical elevated "eye," which occurs on the Northwest Coast also, suggest to him a related origin. In the spurred line and alternating spur motives of Old Bering Sea art Mr. COLLINS sees a remote indirect relationship with some of the painted pottery of the Neolithic Yang Shao culture of northern and western China.

Mr. COLLINS' admirable volume, which was recently (1936) awarded the Gold Medal of the Royal Academy of Science and Letters of Denmark,

will give an added impetus to the investigation of a profoundly important subject. There is a good bibliography and an index.

New York University. M. F. ASHLEY-MONTAGU.

E. E. Evans-Pritchard. — *Witchcraft, Oracles and Magic among the Azande.* With a Foreword by C. G. SELIGMAN. XXVI + 554 pag. New York : Oford University Press, 1937, ($ 7.50)

This is the best and most exhaustive account of witchcraft, oracles, and magic, as each of these qualities and practises function among a primitive people, that has thus far appeared in a field where there are many admirable studies on the same subjects. We may echo the opening words of Professor SELIGMAN's Foreword, "Dr. EVANS-PRITCHARD has given us good measure, pressed down and running over."

The Azande, among whom the author during several expeditions spent a total of twenty months, are a negroid people living in the Southern Sudan on the Nile-Congo divide. Since 1905 they have been subject to Anglo-Egyptian rule and now live under the Sudan Administration. These relations between the Government and the Azande have proved of great advantage to the author, and he has made the most of them. Throughout the work Dr. EVANS-PRITCHARD keeps completely to the report and explanation of the observations which he made among the Azande, and never for a moment does he enter into theoretical discussions of his data, or bring in examples from other cultures to assist the interpretation of his own observations among the Azande. The result is a repository of facts of the greatest interest and of abiding value to the student of human thought, whether primitive or otherwise.

The present volume is strictly limited to the presentation of the material relating to the subjects designated on its title-page; in further volumes Dr. EVANS-PRITCHARD promises to give us a complete account of Zande culture. In the present volume he provides the reader with a brief outline of Zande culture which is really quite adequate for an understanding of what follows. It is impossible to conceive of any future general discussion of witchcraft, magic, and oracles which will not be obliged to draw heavily upon Dr. EVANS-PRITCHARD's book. The book is very attractively written, and not alone the anthropologist, but anyone desirous of gaining some insight into the actual operation of human thought will benefit greatly from a reading of this excellent volume.

New York University. M. F. ASHLEY-MONTAGU

Arthur O. Lovejoy. — *The Great Chain of Being.* ix + 382 pp. Harvard University Press, Cambridge, Mass., 1936. (Price $4.00).

There are some aspects of Professor LOVEJOY's book which the review by Professor H. T. DAVIS (*Isis*, XXVII (May, 1937), 111-4) did not include. Except for the last six pages (pp. 327-333) which are devoted to some philosophical remarks, this book is a history, as the sub-title "A Study of the History of an Idea" indicates. As a history, *The Great Chain of Being* has particular significance for the readers of *Isis*. The ideas with which it deals were of the greatest importance not only in the development of the modern conception of the universe, but also in the growth of the theory of evolution in the 18th and early 19th centuries.

The book consists of 11 lectures, given as the William James Lectures on Philosophy and Psychology at Harvard during the second half of the academic year 1932-3. In the first lecture Professor LOVEJOY gives an exposition of his conception of the history of ideas and of the technique to be employed in investigating that history. The history of ideas, in his sense, is the sister discipline of the history of science. It is chiefly the history of those fundamental assumptions or ruling ideas which mold the *Weltanschauung* of a culture or of an individual. It is differentiated from the history of philosophy in that it is not a history of the systems of great philosophers. It regards an idea as important not because of its logical significance in the thought of a philosopher, but because of its formative influence on the beliefs of mankind. Hence this discipline is in part a study of the prevalence of ideas. It seeks to discover the occurrence of an idea among writers of all kinds, e.g. novelists, preachers, scientists, etc. Like the history of science, it crosses linguistic and national boundaries, as well as departmental boundaries in modern universities. Perhaps more than any other historical discipline, it humanizes the mind and cleanses it of parochialism. For in the very act of studying the growth of the assumptions, preconceptions, and beliefs of earlier generations, the student is forced to divest himself of his often unconsciously held assumptions and his ruling modes of abstraction.

The story related in *The Great Chain of Being* is that of the conception of the universe as a chain of being, i.e. as a continuum of created beings in which all logically conceivable beings exist. The conception arose as an attempt to answer two questions : (1) Why has the "other-worldly" perfect self-sufficient God of PLATO, the neo-Platonists, and the Christian theologians, created a universe which is necessarily less perfect than himself and which can in no way make him more perfect? (2) "What principle determines the number of kinds of being that make up the sensible and temporal world?" PLATO answered both questions in the

Timaeus. The Demiurgus created the universe because he was "good", i.e. devoid of envy, and therefore desired "that everything should so far as possible be like himself". Professor LOVEJOY points out that "good" here has a quite different meaning from "good"when predicated of God in his "other-worldly" self-sufficient aspect, and the solution to the problem is unsatisfactory. Nevertheless it was the solution accepted for more than two millennia by "many philosophers, most men of science, and, indeed, most educated men." The answer to the second question is that the Demiurgus has created *all* forms of being, because otherwise the creation will not "be so far as possible like himself", i.e. complete. The principle that the creator must have created a "full" universe Professor LOVEJOY names the principle of plenitude. The neo-Platonists took the principle from PLATO, and merged with it the idea of continuity which they found in the writings of ARISTOTLE to formulate the complete notion of the chain of being.

Professor LOVEJOY goes on to show how the principle of plenitude was explicitly or tacitly used to reconcile the two essentially contrary conceptions of a self-sufficient God and a creating God in medieval thought, and how such writers as AUGUSTINE, ABELARD, AQUINAS, and DANTE managed to conceal the incompatibility of the two. He gives illustrations of the same conflict in the writings of several Renascence authors, namely ROBERT FLUDD, Cardinal BELLARMINO, and JOHN NORRIS of Bemerton.

The fourth lecture, "The Principle of Plenitude and the New Cosmography," is an account of the rôle which the principle of plenitude played in bringing about the change from the medieval conception of a geocentric closed universe to the seventeenth century conception of an infinite universe without a center. The latter belief, made popular by such books as FONTENELLE's *Pluralité des mondes* (1686), was not altogether derived from the astronomical discoveries of COPERNICUS, KEPLER, and their followers; it arose largely from the assumption that a "full" universe, with infinite planets circling infinite stars, was the kind of a universe a "good" God would make. Scientific proof that stellar distances were of the order to allow such a notion of the universe was not forthcoming until the discovery of stellar parallaxes in the nineteenth century.

After discussing the principle of plenitude and the conception of the chain of being in relation to the thought of SPINOZA and LEIBNIZ, Professor LOVEJOY proceeds to describe various notions current in the eighteenth century about man's place in nature and about the good life which arose as corollaries of the idea of the chain of being. Among these was POPE's eloquent denunciation of "pride", man's error when he tries to live

above his place in the chain of being. The principle of plenitude was also at the bottom of that melancholy "optimism" which VOLTAIRE satirized in *Candide*.

Lecture VIII, "The Chain of Being and some Aspects of Eighteenth-Century Biology," and Lecture IX, "The Temporalizing of the Chain of Being," discuss the metaphysical foundations of the historical development of the theory of biological evolution. Among other things, the conception of the chain of being as a continuum prepared the way for a denial of the immutability of species. Moreover, it sent biologists on a search for "missing links"; this pursuit became so popular that P. T. BARNUM actually had circus exhibits of missing links during the early 1840's, over a decade before DARWIN's *Origin of Species* (1859). But the chain of being as it was conceived before 1700 was a bar to a theory of evolution, because it assumed that God's "goodness", being eternal, must necessarily have led him to create all beings from eternity. Beginning with LEIBNIZ, HENRY MORE, and JOSEPH ADDISON, Professor LOVEJOY traces the growth of the conception of the chain of being as a program to be completed in time, as a process toward perfection, not a static arrangment for all time. In EDWARD YOUNG's *Night Thoughts* (1742-4) this notion of progressive development toward completion is applied to the life history of stars — stellar evolution, as we should say today — and it was expounded at length though somewhat vaguely in MARK AKENSIDE's influential poem *The Pleasures of the Imagination* (1744). As a result of this development, the chain of being became a conception highly congenial to the birth of the theory of biological evolution.

In his tenth lecture, "Romanticism and the Principle of Plenitude", Professor LOVEJOY shows how the thoroughgoing identification of "goodness" with a "full" universe and with a creator who created *all* possible beings led to a revolutionary shift in values in such normative fields as ethics, politics, and aesthetics. Whereas formerly the good was held to consist of what is universally and invariably true in all times and all places, in the latter half of the eighteenth century the good came to consist of whatever is representative of the fullness of the universe. Hence, diversity became "of the essence of excellence." That the principle of plenitude was the *only* cause in bringing about the change in values which we call the Romantic movement, Professor LOVEJOY expressly denies. But he makes a highly convincing case for the view that it was "the one *common* factor in a number of otherwise diverse tendencies which, by one or another critic or historian, have been termed 'Romantic' ". Indeed, for the German romantic writers his evidence seems conclusive. An equal abundance of texts from French and English writers would be desirable.

The Great Chain of Being is an original and profound study of one of the most influential ideas in the growth of western civilization. It is full of subtle and profound distinctions which are expounded with an exhilarating clarity and wit. Whoever wishes to understand the relationship between man's "ruling" ideas and his conceptions of physical nature, human nature, and the place of man in the universe, and whoever, to paraphrase Professor A. N. WHITEHEAD, wishes to jog himself out of his current historical abstractions, cannot do better than read this book.

(University of Michigan.) HENRY V. S. OGDEN

Fifty-second Critical Bibliography

of the

History and philosophy of Science and of the History of Civilization

(to end of October 1937—with special reference to chemistry, technology and the biological sciences)

This fifty-second Bibliography contains about 445 items of which 130 deal with chemistry, technology and the biological sciences. They have been kindly contributed by the nine following scholars belonging to five different countries :

C. W. ADAMS (Hertford, England)
M. F. ASHLEY-MONTAGU (New York)
F. M. FELDHAUS (Berlin)
C. A. KOFOID (Berkeley, Calif.)
C. D. LEAKE (San Francisco)
O. NEUGEBAUER (Copenhagen)
J. PELSENEER (Brussels)
A. POGO (Washington, D.C.)
G. SARTON (Cambridge, Mass.).

This Bibliography includes as usual a series of addenda and errata to SARTON's *Introduction to the History of Science*, vols. 1 and 2 (Baltimore and London, 1927 and 1931). Its purpose and methods have been explained in the preface to the 38th Critical Bibliography (*Isis* 20, 506-08).

Section 25 to 29 dealing with chemistry, technology and the biological sciences are especially full, as I have liquidated as much as I could of my stock of notes concerning them.

I have in my drawers a large number of notes which I will be glad to publish as soon as I have been able to check them upon the originals.

The Historical and ethnographical classification (Part II) contains a new section (IV), " The New World and Africa " divided into three subsections (*a*) America, (*b*) Oceania, (*c*) Africa. (These subsections have not been numbered in order not to disturb the numbering of sections of Part III).

I entreat the authors of relevant books and papers to send me copies of them *as promptly as possible* in order that their studies may be registered in this Bibliography and eventually reviewed and discussed. By so doing they will not simply help me and every other historian of science but they will help themselves in the best manner for they will obtain for their work the most valuable publicity and its certain incorporation into the literature of the subject.

Many of the notes were checked and the final manuscript and proofs of this Critical Bibliography were kindly read by Dr. M. C. WELBORN.

Harvard Library, 185.
Cambridge, Mass.

GEORGE SARTON.
Nov. 3, 1937.

PART I

FUNDAMENTAL CLASSIFICATION (CENTURIAL)

Vth Century B.C.

Egermann, Franz. Neue Forschungen zu THUKYDIDES (Methodenkapitel). *Deutsche Literaturzeitung* 58, 1471-80, 1504-09, 1937 (to be cont'd). ISIS

Lundmark, Knut. On DEMOKRITOS' conception of the milky way. 7 p. Lund Observatory, historical notes and papers, no. 2, 1935. ISIS

IVth Century B.C. (second half)

Baumann, E. D. PRAXAGORAS von Kos. *Janus* 41, 167-85, 1937. ISIS

Lundmark, Knut. ARISTOTLE as practical astronomer. 8 p. Lund Observatory, historical notes and papers, no. 1, 1935. ISIS

IInd Century B.C. (whole and first half)

Zenodoros (*Introd.*, I, 182). ZENODOROS' Abhandlung über die isoperimetrischen Figuren, nach den Auszügen, welche uns die Alexandriner THEON und PAPPUS aus derselben überliefert haben, deutsch bearbeitet von Dr. (A.) NOKK. Als Beilage zu dem Freiburger Lyceums-Programme von 1860 (33 S.). ISIS

Addition kindly communicated by O. NEUGEBAUER (Copenhagen).

IInd Century (whole and first half)

Celli-Fraentzel, Anna. L'imperatore TRAJANO (98-117) ed il risanamento dell'urbe. *Rivista di storia delle scienze mediche* 28, 233-43, 1937. ISIS

Diller, Aubrey. The Vatopedi manuscript of PTOLEMY and STRABO. *American journal of philol.* 58, 174-84, 1937. ISIS

Nunn, George E. MARINUS OF TYRE'S place in the COLUMBUS concepts. *Imago mundi* 2, 27-35, 1937. ISIS

IVth Century (second half)

Epiphanius. Treatise on weights and measures. The Syriac version. Edited by JAMES ELMER DEAN. With a foreword by MARTIN SPRENGLING. XV + 145 p. (Oriental Institute of the University of Chicago, *Studies in ancient oriental civilization*, no. 11). University of Chicago Press, 1935. ISIS

Reviewed by G. S., *Isis*, 27, 332-33, 1937.

Rome, A. THÉON D'ALEXANDRIE : Commentaire sur les livres 1 et 2 de l'*Almageste*. Tome II. pp. lxxvii-cvii+pp. 317-805, 60*bis* fig. (Studi e testi, 72, Commentaires de PAPPUS et de THÉON D'ALEXANDRIE sur l'*Almageste*). Città del Vaticano, Biblioteca Apostolica Vaticana, 1936. ISIS

This is a companion piece to the author's edition of PAPPOS' commentary on the *Almagest* (1931; *Isis* 19, 381). The critical edition of the text is preceded by an Introduction divided as follows : 1. Editions et traductions des livres 1 et 2 de THÉON; 2. Notes sur THÉON; 3. Principes de l'établissement du texte; 4. Addenda et corrigenda, and by a very valuable memoir explaining how to use the astronomical tables of PTOLEMY. I repeat the offer made by me in *Isis* (19, 381); I will gladly give my copy of this book and of the preceding one to any competent scholar willing to review them for *Isis*. G. S.

VIIIth Century (second half)

Ruska, Julius. Neue GÂBIR-Texte. *OLZ* 40, 485-86, 1937. ISIS

Xth Century (whole and first half)

Modi, Sir Jivanji Jamshedji. MAS'UDI's account of the Pesdadian kings. *Journal K. R. Cama oriental institute*, no. 27, 6-32, 1935. ISIS

Modi, Sir Jivanji Jamshedji. ZARATHUSTRA and Zoroastrianism in MAÇOUDI's *Kitāb-i murūj al-zahab va ma'adan aljauhar* (Book of meadows of gold and mines of jewels). *Journal K. R. Cama oriental Institute*, no. 25, 148-55, 1933. ISIS

Xth Century (second half)

Hermannsson, Halldór. The problem of Wineland. *Islandica* 25, 84 p. Ithaca, N.Y., Cornell University library, 1936. ISIS

Reviewed by M. A. SPENDER, *Geographical journal* 90, 68-9, 1937. Conclusions : " LEIF's route and that of KARLSEFNI were inside Newfoundland, across the Gulf of St. Lawrence; Wineland was on the coast between Cape Cod and Nova Scotia. Helluland and Markland were both on the coast of Labrador, north and south of Hamilton Inlet respectively. C. W. A.

Minorsky, V. A Persian geographer of A.D. 982 on the orography of Central Asia. *Geographical journal* 90, 259-64, 1937. ISIS

" The object of the present paper is to analyze the ideas of the Muslims on the orography of Central Asia as they appear in the Persian geography written in A. D. 982, and bearing the title of *Ḥudūd al-'ālam*, which may be translated as ' The regions of the world.' The author, whose name is unknown, dedicated his work to the local ruler of Gozgan (Northern Afghanistan) and presumably himself lived in the same region. From the point of view of Persian literature, the importance of the book is obvious, for it is earlier than FIRDAUSI's famous ' Shah-nama (A. D. 994). As regards its contents, it is a compilation based chiefly on earlier books in Arabic, but the writer has preserved to us some very valuable data on such countries as China, Tibet, India, and Central Asia which are not found elsewhere. There are good reasons for believing that the original authority for these particular data is ABŪ 'ABDULLĀH MUḤAMMAD IBN-AḤMAD JAYHANĪ."... " The author often mentions a map prepared by himself, on which he evidently transferred the details found in JAYHANĪ and the other sources accessible to him. This map has unfortunately not come down to us."... " The description given in the book is not only accurate in its general lines but contains a mass of very precise details. Down to the nineteenth century we should look in vain in European literature for an equally clear picture of Central Asian ranges."

Minorsky, V. Hudūd al-'ālam : The regions of the world. A Persian geography, 372 A.H. Translated and explained by V. MINORSKY. Preface by V. V. BARTHOLD, translated from the Russian. XX + 524 p., 12 maps. (E. J. W. Gibb Memorial, new series, II). London, LUZAC, 1937. ISIS

Reviewed by A. J. ARBERRY, *Geographical journal* 90, 185-86, 1937. " The unique manuscript was discovered by TOUMANSKY in 1892. BARTHOLD published a facsimile at Leningrad in 1930."

Tornøe, J. Kr.; Crone, G. R. Hvitserkr. *Geographical journal*, 89, 552-56, 1937. ISIS

ERIK THE RED's landfall on the Greenland coast, called Bláserk in early

sagas, and Hvitserkr after 1400, is probably identical with a peak in the Watkins Mountains. C. W. A.

XIth Century (whole and first half)

Sbath, Paolo. Massime di ELIA Metropolitano di Nisibi (975-1056). Testo arabo curato e pubblicato per la prima volta, con traduzione italiana e francese. 64 + xii p. Cairo, al-Chark, 1936. ISIS

First Arabic edition of 163 maxims of ELIAS BAR SHĪNĀYĀ (see my *Introduction* 1, 735), with French and Italian translations, and a short introduction. These maxims are rather commonplace, and they are all mixed without order; some are purely religious (Christian); others may be called philosophical, ethical, social or medical. The medical maxims are 32 in number. This is a very thin book in spite of every effort to make it thicker, e. g., by the use of very thick paper and the printing of twelve pages of self advertizement in the end. The title page is replaced by a loathsome dedication to MUSSOLINI and there is a portrait of the latter on horseback in frontispiece! All of which is highly irrelevant, except as biographical information on the author "prêtre syrien d'Alep, membre de l'Institut d'Egypte." G. S.

XIIIth Century (whole and first half)

Dienes, Mary. Eastern missions of the Hungarian Dominicans in the first half of the thirteenth century. *Isis* 27, 225-41, 1937. ISIS

Şerefeddin, M. Sicilya Cevaplari. 175 p. Istanbul, Bozkurt Matbaasi, 1934 (in Turkish). ISIS

Reviewed by OTTO PRETZL, *OLZ* 40, 533, 1937 Apropos of the "Sicilian question" submitted to IBN SAB'IN by FREDERICK II (see SARTON's *Intr.* I, 598). G. S.

XIIIth Century (second half)

Renaud, H. P. J. Sur les dates de la vie du mathématicien arabe marocain IBN AL-BANNĀ (XII^{e}-XIII^{e} s. J.-C.). *Isis* 27, 216-18, 1937. ISIS

Taylor, E. G. R. The "De ventis" of MATTHEW PARIS. *Imago mundi* 2, 23-6, map, 1937. ISIS

Thomson, S. Harrison. An unnoticed treatise of ROGER BACON on time and motion. *Isis* 27, 219-24, 1937. ISIS

Edition of the text from Madrid Ms. (Bibliotheca Nacional, 3314) with introduction.

XIVth Century (whole and first half)

Hall, John James. Ironwork fastenings of the XIVth century, and the method of their conversion in modern times. *Transactions of the Newcomen Society* 16, 129-39, 4 fig., 1935-36. ISIS

Klibansky, R. Appendix ad praefationem *De dialogis De vera sapientia Petrarcae addictis.* pp. xxi + xxiv. NICOLAI DE CUSA Opera omnia, auspiciis Academiae Heidelbergensis, ad codicum fidem edita, extractum ex volumine V, Aedibus FELICIS MEINER, Lipsiae 1937. ISIS

"Inter opera FRANCISCI PETRARCAE inveniuntur duo dialogi 'De vera sapientia.' Quae ratio intercedat inter hos dialogos sub nomine FR. PETRARCAE typis exaratos et NICOLAI DE CUSA libros 'De sapientia', R. KLIBANSKY satis docte disseruit, cui dissertationem suo tempore libro de CUSANI scriptis inserere propositum est, mecum quae sequuntur communicavit."

Modi, Sir Jivanji Jamshedi. References to ancient Iran in the *Nuzhat-al-qulūb* of ḤAMD-ALLĀH MUSTAWFI. *Journal K. R. Cama oriental society*, no. 31, 128-31, 1937. ISIS

Moody, Ernest. The logic of WILLIAM OF OCKHAM. xiv + 322 p. New York, SHEED and WARD, 1935. ISIS

Reviewed by A. C. PEGIS, *Speculum* 12, 274-77, 1937.

Noll-Husum, Herbert. Early editions of the *Deutsche Sphaera* of CONRAD OF MEGENBERG (*Isis* 25, 455). ISIS

Answer to Query no. 63. *Isis* 27, 324-25, 1937.

Sudhoff, Karl. ALEXANDER HISPANUS und das Schriftwerk unter seinem Namen. Ein erstes Wort über ihn und Bekanntgabe seiner medizinischen Schriften. *Archiv f. Gesch. d. Med.* 30, 1-25, 1937. ISIS

XIVth Century (second half)

Arabshah, Ahmed Ibn. TAMERLANE or TIMUR the great Amir.

Translated by J. H. SANDERS from the Arabic life. xviii + 341 p., 1 pl., 1 map. London, LUZAC, 1936. ISIS

Reviewed by W. HINZ, *OLZ* 40, 629-31, 1937.

Colin, Georges S. Un nouveau traité grenadin d'hippologie. *Islamica* 6, 332-37, 1934. ISIS

Garosi, A. La vita e l'opera di FRANCESCO CASINI archiatro di sei Papi. *Bullettino Senese di storia patria*, nuova serie, 6, Fascicolo 4, 1935. ISIS

Reviewed by G. VERITÀ, *Rivista di storia delle scienze mediche e naturali* 28, 158, 1937.

Klett, Werner. The vision of WILLIAM concerning PIERS the Plowman by WILLIAM LANGLAND (14. Jahrhundert) unter dem Titel PETER der Pflüger aus dem Mittelenglischen ins Deutsche übersetzt. 79 p. Bonn, BRAND, 1935. ISIS

Reviewed by F. P. MAGOUN, jr., *Speculum* 12, 125, 1937.

Löhmann, Otto. Die Rahmenerzählung des *Decameron*, ihre Quellen und Nachwirkungen. Ein Beitrag zur Geschichte der Rahmenerzählung. vii + 232 p. (*Romanistische Arbeiten*, 22). Halle a.S., NIEMEYER, 1935. ISIS

Reviewed by ALBERT WESSELSKI, *DLZ* 58, 137-45, 1937.

Mersand, Joseph. CHAUCER's romance vocabulary. 175 p. New York, Comet Press, 1937. ISIS

Michel, Louis. Les légendes épiques carolingiennes dans l'œuvre de JEAN D'OUTREMEUSE. 432 p. (Mémoire couronné par l'Académie). Académie royale de langue et de littérature françaises de Belgique, *Mémoires* 10, Brussels, 1935. ISIS

Thomson, S. Harrison. Unnoticed MSS and works of WYCLIF. *Journal of theological studies* 38, 24-36, 139-48, 1937. ISIS

XVth century (whole and first half)

Nowell, Charles E.; Crone, G. R. The Bianco chart, 1448, and the Pillars of Hercules. *Geographical journal* 89, 485-86, 1937. ISIS

As knowledge extended, the site of the Pillars was pushed farther from the Straits of Gibraltar, but they were marked on charts down to 1492 at least. C. W. A.

Uhden, Richard. An equidistant and a trapezoidal projection of the early fifteenth century. *Imago mundi* 2, 8, map, 1937. ISIS

XVth Century (second half)

Crone, G. R. The alleged pre-columbian discovery of America. *Geographical journal* 89, 455-60, 1937. ISIS

Suggests that the four arguments adduced by Senhor JAIME CORTESÃO, *Geographical journal* 89, 29-42, 1937, are all open to objections sufficiently weighty to require suspension of judgment. C. W. A.

Garosi, A. I codici di medicina del Maestro ALESSANDRO SERMONETA (d. 1486). *Rivista di storia delle scienze mediche* 28, 225-32, 1 pl., 1937. ISIS

Holcomb, Richmond Cranston. Who gave the world syphilis? The Haitian myth. With introduction by C. S. BUTLER. 189 p. New York, Froben Press, 1937. ISIS

Reviewed in *Annals of medical history* 9, 514-15, 1937.

Moore, Merrill; Solomon, Harry C. JOSEPH GRÜNPECK and his neat treatise (1496 A.D.) on the French evil. *British journal of venereal diseases* 11, 1-24, 1935. ISIS

Translation with biographical notes. GRÜNPECK was born about 1470 at Burghausen, and died sometime after 1519. He was not a physician, but a poet and dramatist. His tract on syphilis was among the earliest to recognize clearly the venereal contagiousness of the disease, but it was largely religious and astrological. C. D. L.

(Regiomontanus). Der deutsche Kalender des JOHANNES REGIOMONTAN, Nürnberg, um 1474. Faksimiledruck nach dem Exemplar Preussischen Staatsbibliothek. Mit einer Einleitung von ERNST ZINNER. (19 p.) (Veröffentlichungen der Gesellschaft für Typenkunde der XV. Jahrhunderts-Wiegendruckgesellschaft. Reihe B, Seltene Frühdrucke in Nachbildungen, 1). Leipzig, HARRASSOWITZ, 1937. ISIS

This very beautiful publication was distributed to the members of the Deutsche Gesellschaft für Geschichte der Medizin, apropos of the fifth

centenary of REGIOMONTANUS' birth (1436-76). Elaborate preface (20 p.) by the best authority on the subject, Dr. ZINNER. G. S.

XVIth Century (whole and first half)

B.—*Physical sciences and technology*

Lockemann. COPPERNICUS ein Deutscher! *Mitt. z. Gesch. d. Med., d. Naturw. u. d. Techn.* 36, 360, 1937. ISIS

McColley, Grant. The eighth sphere of *De revolutionibus*. *Annals of science* 2, 354-56, 1 pl., 1937. ISIS

C.—*Natural sciences*

Akçura, Yusuf. PIRI REIS haritasi. Explanatory note in Turkish, German, English and French. 21 p., facsimile (dated 1933) of map in separate case. (*Society for Turkish historical research*, 1). Istanbul, Devlet Basimevi, 1935. ISIS

Reviewed by E. HEAWOOD, *Geographical journal* 90, 85, 1937. Coloured facsimile of the western half of a world map drawn by the Turkish admiral PIRI REIS at Gallipoli in 1513, and discovered recently in the Serai Library at Istanbul. The eastern half has not been found. C. W. A.

Caraci, G. A little known atlas by Vescomte MAGGIOLO, 1518. *Imago mundi* 2, 37-54, map, 4 fig., 1937. ISIS

Stephens, A. E. " The booke of the sea carte " ; a seaman's manual of the sixteenth century. *Imago mundi* 2, 55-9, 1937. ISIS

Winter, Heinrich. The pseudo-Labrador and the oblique meridian. *Imago mundi* 2, 61-73, 1937. ISIS

D.—*Medical sciences*

Lambert, Samuel W. Description of the vermiform appendix, from the " De fabrica " of VESALIUS. *Annals of medical history* 9, 422-27, 3 fig., 1937. ISIS

Rosenkranz, Klaus. Die Initialen in VESALS Anatomie. Ein Beitrag zur Geschichte der anatomischen Abbildung. *Archiv f. Gesch. d. Med.* 30, 35-46, 30 fig., 1937. ISIS

Sutcliffe, J. H. The *Tabula oculorum morbos comprehendens* of LEONHART FUCHS. *Dioptric review* 38, 347-53, 1936. ISIS

Editorial of the *Dioptric Review* (Transactions of the British Optical Association) with large size facsimile (46.5 × 29.5 cm.) and English translation, of that very remarkable document dated August 6, 1538. The B. O. A. is to be congratulated for that very beautiful publication. G. S.

E.—*Alia*

Le Van Baumer, Franklin. CHRISTOPHER ST. GERMAN. The political philosophy of a Tudor lawyer. *American historical review* 42, 631-51, 1937. ISIS

XVIth Century (second half)

B.—*Physical sciences and technology*

Abbot, C. G. Astronomy in SHAKESPEARE's time and in ours. *Annual report of the Smithsonian Institution for* 1936, pp. 109-22, 6 pl., 1937. ISIS

McColley, Grant. WILLIAM GILBERT and the English reputation of GIORDANO BRUNO. *Annals of science* 2, 353-54, 1937. ISIS

C.—*Natural sciences*

Bagrow, Leo. The first German Ortelius. *Imago mundi* 2, 74, 1937. ISIS

Hakluyt, Richard. The original writings and correspondence of the two RICHARD HAKLUYTS. Edited with an introduction and notes by E. G. R. TAYLOR. 2 vols., xiv + xiv + 516 p., 10 illus., maps. London, Hakluyt Society, 1935. ISIS

Reviewed by FRANCIS R. JOHNSON, *Isis* 27, 333, 1937.

E.—*Alia*

Silvette, Herbert. On looking into HOLLAND's PLINY. *Medical life* 44, 261-88, 1937. ISIS

Apropos of the great Elizabethan translator PHILEMON HOLLAND (1552-1637). G. S.

XVIIth Century (whole and first half)

B.—*Physical sciences and technology*

De Donder, Th.; Pelseneer, Jean. La vitesse de propagation de la lumière selon DESCARTES. Académie royale de Belgique, *Bulletin de la classe des sciences* 23, 689-92, 1937. ISIS

The Cartesian theory of 1637 seemed to imply that the spread of light was infinite; RÖMER proved in 1676 that it was finite. However the contradiction is not as complete as first appears for DESCARTES considered the phenomena of light in two different ways; a field theory in an incompressible aether compatible with infinite speed, and a transportation of energy implying finite speed. G. S.

Mersenne, M. Correspondance du P. MARIN MERSENNE, religieux Minime, publiée par M^me^ PAUL TANNERY, éditée et annotée par CORNELIS DE WAARD, avec la collaboration de RENÉ PINTARD. Tome II, 1628-1630; xvi + 708 p., ill. Paris, BEAUCHESNE, 1937. ISIS

Reviewed by JEAN PELSENEER, *Isis* 27, 334-36, 1937.

Metzger, Hélène. La philosophie chimique de JEAN-BAPTISTE VAN HELMONT. *Ann. Guébhard-Séverine*, 12, 140-56, 1936. ISIS

Survey of the chemical and scientific views of VAN HELMONT (1577-1644) as revealed in his collected works published after his death by his son, FRANÇOIS MERCURE. VAN HELMONT opposed scholastic philosophy generally, assailing Aristotelian rules of reasoning, astrological explanations, and "science" based on analogy rather than proof. He advocated natural observation and laboratory experiment, but admitted the importance of theory. He attacked directly the ancient concept of four elements and also the three components of PARACELSUS. He admitted only air and water as elements. His concept of "ferments" arose from his theory by which water was the basic substance of all things. His notion of "gas" developed from his solvent theory of air. C. D. L.

Mitchell, W. Fraser; Ashley-Montagu, M. F. DONNE the astronomer. *London Times literary supplement*, p. 576, August 7, 1937. ISIS

Patterson, T. S. JEAN BEGUIN and his *Tyrocinium chymicum*. *Annals of science* 2, 243-98, 27 fig., 1937. ISIS

Very elaborate study of the *Tyrocinium chymicum* (1610) and of its many editions. "It is certain on account of the large number of editions issued,

that BEGUIN's little book was found to be of great practical value, and it must have done much in unostentatious fashion to guide real chemistry along a sound experimental path. On that account it might have been expected to be much more definitely singled out for praise by historians of medicine, pharmacy and chemistry, and given the credit which is undoubtedly its due, than has been the case. It is of course clear that BEGUIN was much under alchymical influence; this is shown by his reference to HERMES, LULLY, AVICENNA, the *Clangor Buccinae*, the *Turba Philosophorum* as authorities, and by his adoption here and there of concealments and wrappings and his occasional use of an ancient phraseology. But his was a common-sense alchymy and he used its philosophy in an entirely reasonable manner. There was little of the fantastic and nothing of the quack or imposter, or even of the willing dupe or self-deceiver, in him or—as far as we can judge by BARTH, GLÜCKRADT and others—in his adherents. But while the *Tyrocinium* pursued the quiet and unobtrusive tenor of its way, love of the sensational, as active then as it is now, seems to have attracted far more attention to the various lies and forgeries which in that uncritical period accumulated around the memory of PARACELSUS or were poured out from a press, fed by the rather sardonic humour of men like JOHANN THÖLDE or MICHAEL MAIER, who conveniently created, not merely alchymy, but alchymists as well, and who have much to be responsible for in the perversion of chemical history."

C. — *Natural sciences*

Baker, J. N. L. Some Dutch charts of the XVIIth century. *Imago mundi* 2, 36, 1937. ISIS

Kuchař, Karel. A map of Bohemia of the time of the Thirty Year's war. *Imago mundi* 2, 75-7, 1937. ISIS

D.—*Medical sciences*

Coyecque, Ernest. Traitement à forfait de la syphilis (1639 et 1644). *Bulletin de la société française d'histoire de la médecine* 31, 187-88, 1937. ISIS

Gibson, Thomas. Letters of Dr. THÉODORE TURQUET DE MAYERNE to the syndics and executive council of the Republic of Geneva. *Annals of medical history* 9, 401-21, 2 fig., 1937. ISIS

Napjus, J. W. Bijzonderheden omtrent de voorouders van JOHANNES ANTONIDES VAN DER LINDEN en in het bijzonder omtrent zijn vader, ANTONIUS VAN DER LINDEN. *Bijdragen tot de geschiedenis der geneeskunde* 17, 141-44, 1937. ISIS

Silvette, Herbert. The doctor on the stage. Medicine and medical men in seventeenth century English drama. *Annals of medical history* 9, 482-507, 1937 (end). ISIS

E.—*Alia*

Coffin, Charles Monroe. DONNE's astronomy. *London times literary supplement*, Sept. 18, p. 475, 1937. ISIS

McColley, Grant. Bishop JOHN WILKINS and the definition of science. *Isis* 27, 261-63, 1937. ISIS

McColley, Grant. *The man in the moone* and *Nuncius inanimatus*. For the first time edited, with introduction and notes, from unique copies of the first editions of London, 1629 and London, 1638. *Smith College studies in modern languages* 19, xiv + 78 p., frontispiece, Northampton, Mass., 1937. ISIS

"There is no more compelling evidence of the vital interest of the seventeenth century in the new worlds which the telescope had disclosed than the success which came to *The man in the moone* of Bishop FRANCIS GODWIN. By this success I do not refer to its direct influence upon CYRANO DE BERGERAC and its less obvious but equally powerful indirect effect upon two centuries of imaginary voyages. Rather do I refer to the enduring stimulation which many readers of diverse nationalities quite obviously obtained from the work itself. First printed in English in 1638, it was published in French translation in 1648, in Dutch, 1651, and in German in 1659. The exact number of continental editions is unknown, but at least a dozen had appeared by 1718. A second English edition was printed in 1657, and in 1686 an enterprising publisher of chapbooks, NATHANIEL CROUCH, included a partially compressed text of *The man in the moone* in his popular *View of the English acquisitions... in the East Indies*. Five editions, all from this mutilated text, and with some incidental change and further compression followed within eighty years. From one of the later of these incomplete editions, as preserved in the *Harleian miscellany*, came the reprint by HÖNNCHER upon which students have largely depended since 1888. It is a conservative estimate that during the years between 1638 and 1768, the dates of the first and last London editions, there were published in four languages twenty-five editions of *The man in the moone*."

XVIIth Century (second half)

A.—*Mathematics*

Dickinson, G. A. WALLI's product for $\pi/2$. *Mathematical gazette* 21, 135-39, 1937. ISIS

Fueter, Eduard. ISAAK NEWTON und die schweizerischen Naturforscher seiner Zeit. Zum 250. Erscheinungsjahr der "Philosophiae naturalis principia mathematica" (1687-1937). 32 p. *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich* 82, no. 28, 1937. ISIS

Lenzen, V. F. NEWTON's third law of motion. *Isis* 27, 258-60, 1937. ISIS

Pelseneer, Jean. La pomme de NEWTON. *Ciel et terre* nº 6-7, 4 p., 1937. ISIS

Slichter, C. S. The *Principia* and the modern age. *American mathematical monthly* 44, 433-44, 2 fig., 1937. ISIS

Stukeley, William. Memoirs of Sir ISAAC NEWTON's life, 1752. Edited by A. HASTINGS WHITE. xvii + 86 p., ill. London, TAYLOR and FRANCIS, 1936. ISIS

Reviewed by J. PELSENEER, *Isis* 27, 336, 1937.

C.—*Natural sciences*

Aloisi, P. DOMENICO GUGLIELMINI (1655-1710) e la cristallografia. *Periodico di mineralogia* 8, 163-75, 1937. ISIS

"Senza voler diminuire i meriti grandissimi del ROMÉ DE L'ISLE e dell'HAÜY, si può affermare, mi sembra, che un secolo prima di loro, ed in condizioni senza confronto, più difficili, il GUGLIELMINI aveva già stabilito i fondamenti della cristallografia."

Baker, J. N. L. The earliest maps of H. MOLL. *Imago mundi* 2, 16, 1937. ISIS

Bolton, Herbert Eugene. Rim of Christendom: a biography of EUSEBIO FRANCISCO KINO, Pacific Coast pioneer. xiv + 644 p. New York, MACMILLAN, 1936. ISIS

Reviewed by E. W. GILBERT, *Geographical journal* 90, 86-7, 1937. 1645-1711, born Italy, educated Germany, name often spelt KÜHN. First to reach Pacific across Lower California; a trained cartographer; his maps first to show Lower California as a peninsula and not as an island. C. W. A.

Nardi, G. M. L'opera scientifica di DIACINTO CESTONI nella valutazione di RENÉ DE RÉAUMUR, nel I. centenario della nascita. *Rivista di storia delle scienze mediche* 28, 202-03, 1937. ISIS

Roncière, Charles de la. Le Père de la Louisiane ; Cavelier de la SALLE. 128 p. Tours, MAME, 1936. ISIS

Reviewed by E. W. GILBERT, *Geographical journal* 89, 481, 1937.

Sarton, George. RUMPHIUS, Plinius Indicus (1628-1702). *Isis* 27, 242-57, 9 fig., 1937. ISIS

Taylor, E. G. R. The geographical ideas of ROBERT HOOKE. *Geographical journal* 89, 525-38, 1937. ISIS

D.—*Medical sciences*

Friedman, Reuben. " Scabies day "; June 20, 1937. *Medical life* 44, 229-51, 1937. ISIS

" The 250th anniversary of BONOMO's discovery of the parasaitic origin of scabies. A discussion of the significance with particular reference to its relationship to the development of the theory of the parasaitic nature of infectious diseases."

Meier, Karl. Über die echte Mumie. *Archiv f. Gesch. d. Med.* 30, 62-77, 1937. ISIS

Extracts from ENGELBERT KAEMFER's *Amoenitatum exoticarum*... fascicoli V (Lemgo 1712), Über die echte Mumie (pp. 516-24), Über den Medina-Wurm (pp. 525-34). G. S.

Neveu, Raymond. Les observations médicales de JEAN-FRANÇOIS REGNARD en Laponie (1681). *Bulletin de la société française d'histoire de la médecine* 31, 163-69, 1937. ISIS

Ünver, S. Süheyl. Le médecin SALIH Efendi et la thérapie de l'amour au XVII[e] siècle. *Tib Dünyasi* 9, 3260-63, 1936 (in Turkish with French translation). ISIS

E.—*Alia*

Brodier, L. La maladie et la mort de BOSSUET. *Bulletin de la société française d'histoire de la médecine* 31, 145-62, 1937. ISIS

Lovejoy, Arthur O. MILTON and the paradox of the fortunate fall. *ELH, a journal of English literary history* 4, 161-79, 1937. ISIS

Merton, Robert K. Some economic factors in seventeenth century English science. *Scientia* 142-52, Sept. 1937. ISIS

"The spread and growth of international commerce and the increased importance of solving navigational problems during the seventeenth century served to direct the contemporary theoretic science into specific fields. The processes through which scientific interests became focussed upon determinate problems are clearly manifested in the history of attempts to find the longitude at sea. Even the direction of abstruse developments in pure mathematics may be conditioned, if not fixed, by current extra-scientific, economic requirements. Some of the specific subjects investigated by such outstanding scientists as NEWTON, HALLEY, FLAMSTEED, HUYGHENS, CASSINI, were probably selected on this basis. The greater part of the nominally pure researches conducted by the Royal Society were directly or indirectly oriented toward economic and other practical considerations. These findings do not preclude acknowledgement of the existence of personal disinterestedness in the scientific pursuit of truth or of an intrinsic, immanent development in science. Not only the selection of problems, but also the experimental methods of approach is in some measure the logical consequence of practical requirements."

Schrecker, Paul. LEIBNIZ et le principe du tiers exclu. Actualités scientifiques et industrielles, no. 393, Actes du congrès international de philosophie scientifique. Sorbonne Paris, 1935. VI. Philosophie des mathématiques, pp. 75-84, Paris, HERMANN, 1936. ISIS

Thomson, Gladys Scott. Life in a noble household 1641-1700 407 p. New York, KNOPF, 1937 ($ 4.00). ISIS

A volume based upon the household papers, account books, bills and letters, which were handled by the officials and servants of WILLIAM RUSSELL, fifth Earl and first Duke of Bedford, over the period extending from 1641 to 1700. As an account of getting and spending, chiefly of spending, by a noble family in the seventeenth century there is nothing to equal the facts presented here. The volume will serve as a useful repository of certain kinds of facts which will be of continued service to students of the seventeenth century in search of decor for their studies. M. F. A.—M.

XVIIIth Century (whole and first half)

B.—*Physical sciences and technology*

Clay, Reginald S.; Court, Thomas H. English instrument making in the 18th century. *Transactions of the Newcomen Society* 16, 45-54, 1935-36. ISIS

Gorbunov, N. P. MIKHAIL VASILYEVICH LOMONOSOV and Russian science. *Bulletin of the Academy of sciences of the USSR*, class of social sciences, no. 1, 3-34, 1937 (in Russian). ISIS

Grekov, B. D. LOMONOSOV's activities in the Academy of sciences. *Bulletin of the Academy of sciences of the USSR*, class of social sciences, no. 1, 175-200, 1937 (in Russian). ISIS

(Lomonosov). *Bulletin of the Academy of sciences of the USSR*, class of social sciences, no. 1, 248 p., port. Moscow, 1937 (in Russian). ISIS

The seven papers which form this issue of the *Bulletin* are listed in the present Critical bibliography under the names of their authors: GORBUNOV, MENSHUTKIN (2 papers), SIDOROV, GREKOV, BERKOV, and VAVILOV. The cover, title page, and table of contents are in Russian and French, but there are, unfortunately, no abstracts in a Western language. The 225th anniversary of LOMONOSOV's birth (1711; probably, Nov. 8/19) was commemorated, on Nov. 21, 1936, by a special joint session of the Academy of sciences and of the State university of Moscow. A. P.

Menshutkin, B. N. The life of MIKHAIL VASILYEVICH LOMONOSOV. *Bulletin of the academy of sciences of the USSR*, class of social sciences, no. 1, 35-147, 1937 (in Russian). ISIS

Menshutkin, B. N. LOMONOSOV's works on chemistry and physics. *Bulletin of the Academy of sciences of the USSR*, class of social sciences, no. 1, 243-47, 1937 (in Russian). ISIS

Sidorov, N. I. LOMONOSOV's factory in Ust-Ruditsa. *Bulletin of the Academy of sciences of the USSR*, class of social sciences, no. 1, 149-74, 1937 (in Russian). ISIS

A well-documented study of LOMONOSOV's industrial venture—the works in Ust-Ruditsa, near St. Petersburg, for the manufacture of colored glass (for mosaics), glass beads, trinkets, etc. A. P.

Vavilov, S. I. LOMONOSOV's ideas and works on optics. *Bulletin of the Academy of sciences of the USSR*, class of social sciences, no. 1, 235-42 1937 (in Russian). ISIS

C.—*Natural sciences*

Bagrow, Leo. IVAN KIRILOV, compiler of the first Russian atlas, 1689-1737. *Imago mundi* 2, 78-82, 1937. ISIS

D.—*Medical sciences*

Howard, John Tilden. The doctors GUSTAVUS BROWN, father and

son, of Charles county, Maryland. *Annals of medical history* 9, 437-48, 2 fig., 1937. ISIS

E.—*Alia*

Berkov, P. N. LOMONOSOV and the problems of the Russian literary language in the 1740 s. *Bulletin of the academy of sciences of the USSR*, class of social sciences, no. 1, 201-34, 1937 (in Russian). ISIS

The alternative translation of the Russian title, " ... and the problem of a Russian literary language..." would, perhaps, be preferable. LOMONOSOV, the pioneer of Russian science, had to solve the problem of adapting the Russian language for scientific as well as literary purposes. A. P.

Mencken, Johann Burkhard (1674-1732). The charlatanry of the learned (*De charlataneria eruditorum*, 1715). Translated from the German by FRANCIS E. LITZ. With notes and an introduction by H. L. MENCKEN. New York, KNOPF, 1937 ($ 2.50). ISIS

De charlataneria eruditorum of JOHANN BURKHARD MENCKEN or MENCKE (1674-1732) was first published as a modest duodecimo at Leipzig in the year 1715. The book was then made up of two lectures delivered during the two preceding years before the faculty and graduating students at Leipzig University. Soon after its publication the little book began to swell with notes, until finally, as the editor of the present translation (from the German) writes, " the two lectures became a thin stream of text flowing over a dense stream of notes." Mr. MENCKEN has dispensed with some nine-tenths of these notes and has retained a pruned one-tenth, himself adding numerous notes which are generally clear and to the point. The editor nods once or twice, and the note referring to ULISSES ALDROVANDUS on p. 72 does that remarkable man much less than justice. At least, the absurdity of J. B.'s reference to ALDROVANDUS might have been pointed out.

Readers of this journal will doubtless be familiar with the fact that the MENCKEN of the *De charlataneria* belonged to the family which was for so long associated with the editing and publication of the *Acta eruditorum*, of which J. B. was himself for some time editor. The editor of the present edition of the *De charlataneria* is a descendant of the same family, though not in the line of J. B.

Readers of the *De charlataneria* to-day will wonder how anyone can have found it in the least diverting. It is very dull. No doubt the eighteenth century found it otherwise, for the work was translated into a number of European languages and new editions of it were issued at frequent intervals; it also had many imitators. The editor's introduction is really more amusing than the text. The translation by FRANCIS E. LITZ is excellent, and the book is very well printed and produced. Clearly, a book on the charlatanry of the learned of our own times is a desideratum. What a book it would make! M. F. A.—M.

Nicolson, Marjorie ; Mohler, Nora M. The scientific background of SWIFT's *Voyage to Laputa*. *Annals of science* 2, 299-34, 1937. ISIS

XVIIIth Century (second half)

B.—*Physical sciences and technology*

Bauer, Edmond. L'œuvre scientifique de COULOMB. *L'Enseignement scientifique* 10, 290-303, 5 fig., 1937. ISIS

Bologa, Valeriu L. Weitere Angaben über ANDRÉ ETIENNE. Answer no. 3 to query no. 48 (*Isis* 67, 102, 114-18). *Isis* 27, 322-24, 1937. ISIS

Bootsgezel, J. J. WILLIAM BLAKEY—a rival to NEWCOMEN. *Transactions of the Newcomen Society* 16, 97-110, 1935-36. ISIS

Cahen, Louis. La vie de COULOMB. *L'enseignement scientifique* 10, 266-69, 1937. ISIS

Fulton, John F. ; Peters, Charlotte H. Works of JOSEPH PRIESTLEY, 1733-1804. Preliminary short title list. 20 p. (mimeographed). New Haven, Yale University school of medicine, 1937. ISIS

Kirby, Richard Shelton. WILLIAM WESTON and his contribution to early American engineering. *Transactions of the Newcomen Society* 16, 111-27, 1 fig., 1935-36. ISIS

Lowry, Lucia M. H. ; Lowry, C. D., jr. ; Miner, John Rice. Count RUMFORD, a youthful meteorologist. *Isis* 27, 264-67, 1937. ISIS

Lowry, Lucia, M. H. ; Lowry, C. D., jr. ; Miner, John Rice. The graveyard fort ; a disputed incident in the life of Count RUMFORD. *Isis* 27, 268-85, 1937. ISIS

White, George. Water bucket engine at Elmdon, Warwickshire. *Transactions of the Newcomen Society* 16, 55-6, 1935-36. ISIS

C.—*Natural sciences*

Jones, W. P. The vogue of natural history in England, 1750-1770. *Annals of science* 2, 345-52, 1937. ISIS

Middleton, William S. BENJAMIN SMITH BARTON. *Annals of medical history* 8, 477-91, 3 fig., 1936. ISIS

D.—*Medical sciences*

Bixler, Elizabeth S. A forerunner of psychiatric nursing, JOAN-BAPTISTE PUSSIN (1746-18-?). *Annals of medical history* 8, 518-19, 1936. ISIS

Hérissay, Jacques. Un traitement par correspondance sous la terreur. *Bulletin de la société française d'histoire de la médecine* 31, 136-44, 1937. ISIS

Mazzini, Giuseppe. Di FRANCESCO ALBERGHETTI imolese medico e benefattore (1762-1851). *Rivista di storia delle scienze mediche* 28, 177-84, 1937. ISIS

Scalinci, Noé. La *Scleropsi* del COTUGNO e una sua *Praelectio* su le malattie oculari. *Rivista di storia delle scienze mediche* 28, 185-97, 1937. ISIS

Tischner, Rudolf. HAHNEMANN und SCHELLING. *Archiv f. Gesch. d. Med.* 30, 98-112, 1937. ISIS

E.—*Alia*

Pearson, Hesketh. TOM PAINE, friend of mankind. 294 p., 5 pl. New York, HARPER, 1937. ISIS

A well informed and beautifully written biography of one of the most generous characters of the American and French revolutions. However the book contains no new information, in fact, nothing which cannot be found in the standard biography by MONCURE D. CONWAY (1892). G. S.

XIXth Century (whole and first half)

A.—*Mathematics*

Loria, Gino. JOSEPH LIOUVILLE and his work. *Scripta mathematica* 4, 147-54, 257-62, 301-06, 1936 (last part received Sept. 1937). ISIS

B.—*Physical sciences and technology*

Weeks, Mary Elvira; Larson, Mary E. J. A. ARFWEDSON and his services to chemistry. *Journal of chemical education* 14, 403-07, 3 fig., 1937. ISIS

Zabarinskij, P. P. The earliest news of WATT's steam engine to reach Russia. *Transactions of the Newcomen Society* 16, 57-67, 1 fig., 1935-36. ISIS

C.—*Natural sciences*

Falconer, J. D. DARWIN in Uruguay. *Nature* 140, 138-39, 1937. ISIS

Psotníčková, Jarmila. Rodokmen J. E. PURKYNĚ. 24 p. Prague 1937. ISIS

Zaunick, Rudolph. CARL GUSTAVCARUS, XIII. Präsident der Leopoldina. Bericht über den Verlauf der Feier der 250. Wiederkehr des Tages der Erhebung der am 1. Jan. 1652 gegründeten Academia Naturae Curiosorum zur " Sacri Romani Imperii Academia Caesareo-Leopoldina Naturae Curiosorum," pp. 68-82, 1937. ISIS

D.—*Medical sciences*

Antwerp, Lee D. van. NATHAN SMITH and early American medical education. *Annals of medical history* 9, 449-63, 5 fig., 1937. ISIS

Bechet, Paul E. JEAN DOMINIQUE LARREY. A great military surgeon. *Annals of medical history* 9, 428-36, 4 fig., 1937. ISIS

Bologa, V. A. DE STOURDZA (STURZA)? Query no. 69. *Isis* 27, 321, 1937. ISIS

Castaldi, Luigi. Il contributo di ANGELO DUBINI alle conoscenze causali della scabbia e l'importanza della sua " Entozoografia " per la storia della microbiologia. *Rivista di storia delle scienze mediche* 28, 204-08, 1937. ISIS

Castaldi, Luigi. Stato della medicina in Toscana un secolo fa. *Rivista di storia delle scienze mediche* 28, 243-51, 1937. ISIS

Van Andel, M. A. Geneeskundige poëzie uit het begin der 19e eeuw. *Bijdragen tot de geschiedenis der geneeskunde* 17, 153-54, 1937. ISIS

E.—*Alia*

Aufrère, L. Essai sur les premières découvertes de BOUCHER DE PERTHES et les origines de l'archéologie primitive (1838-1844). 48 p., 4 fig. (*Épreuves et synthèses*, 1). Paris, STAUDE, 1936. ISIS

Aufrère, L. Le mouvement scientifique à Abbeville dans la première moitié du XIXe siècle et les origines de la préhistoire (1795-1840). *Sciences* 175-95, 6 fig., juillet-août, 1936. ISIS

Ducassé, Pierre. Méthode positive et méthode cartésienne. *Scientia* 6 p., juillet 1937. ISIS

"Nous désirons *poser* le problème des rapports logiques et historiques entre méthode positive et méthode cartésienne, et, surtout, en signaler l'importance 'actuelle' pour la philosophie des sciences. Une telle enquête nous semble susceptible de préciser le sens que revêt le mot 'positif' dans la méthodologie contemporaine, parce que la filiation historique et logique du positivisme au cartésianisme offre un exemple caractéristique de brutale discontinuité apparente, de profonde continuité réelle entre deux formes 'positivistes' de la philosophie des sciences. En précisant, à partir de ses racines cartésiennes, le mouvement méthodologique de COMTE, et la signification réelle de son échec apparent, on élargit assez sensiblement le concept traditionnel de philosophie positive et on ouvre, par là même, aux revendications irrésistibles de l'épistémologie contemporaine, une issue plus fructueuse. Celle-ci reproduit, en effet, sur un nouveau plan, le dépassement caractéristique du cartésianisme par l'exigence synthétique de COMTE. Dans la ligne de l'effort cartésien, repris et transformé par l'expérience positiviste, notre science peut prendre plus nettement conscience d'elle-même, saisir plus rapidement quelques caractères importants d'une nouvelle logique naissante, et, aussi, certaines propriétés directement applicables à la culture profonde de l'individu, à l'organisation abstraite des aspirations collectives."

Ducassé, Pierre. Méthode positive et méthode cartésienne. Travaux du IXe Congrès international de philosophie (Congrès DESCARTES, Paris, 1-6 août 1937). pp. 81-7. ISIS

XIXth Century (second half)

B.—*Physical sciences and technology*

Brunngraber, Rudolf. Radium. 250 p. New York, Random House, 1937 ($2.50). ISIS

A novel, translated from the German by those veteran translators EDEN and CEDAR PAUL, which deals with the exploitation of radium following its discovery by the CURIES. The book, which in translation at least reads very heavily, would have benefited from extensive pruning. As a novel it is far too elaborately organised for so simple a theme, though as a social tract it is not without some value. In dealing with the scientific aspects of his material the author is always reliably informed. M. F. A.—M.

Donnan, F. G.; Haas, Arthur. A commentary on the scientific writings of J. WILLARD GIBBS, Ph. D., L. L. D., formerly professor of mathematical physics in Yale University. Vol. I: Thermodynamics; dealing with the contents of volume one of the Collected works. xxiii + 742 p. Vol. 2: Theoretical physics; dealing with contents of volume two of the Collected works. xx + 605 p. New Haven, Yale University Press, 1936. ISIS

Reviewed by L. N. G. F., *Nature* 140, 298-99, 1937.

Gray, Carl R. The Lincoln car on Union Pacific, 1865. 22 p., illus. The Newcomen Society, American Branch, 1937. ISIS

Svenonius, Björn. Über die ersten astronomischen Photographien und ihre Reproduktion. Die Form der Sonnenkorona am 28. Juli 1851. 21 p., 4 fig. (Meddelande från Lunds astronomiska observatorium, ser. 2, Nr. 84, historical notes and papers, 8). Lund, GLEERUP, 1937. ISIS

C.—*Natural sciences*

Federico, P. J. LOUIS PASTEUR's patents. *Science* 86, 327, 1937. ISIS

Poulton, Sir Edward B. The history of evolutionary thought. As recorded in meetings of the British Association. *Science* 86, 203-14, 1937; also in *Nature* 140, 395-407, 1937. ISIS

Wallis, J. P. R. Fortune my foe: the story of CHARLES JOHN ANDERSSON, African explorer (1827-1867). 412 p. London, CAPE, 1936. ISIS

Reviewed by L. G. C. LAUGHTON, *Geographical journal* 89, 568-89, 1937. Explorer and ornithologist in Damaraland, 1850-1867. C. W. A.

Williamson, Henry. RICHARD JEFFERIES. 423 p. London, FABER and FABER, 1937 (7/6). ISIS

RICHARD JEFFERIES died in 1887 at the age of 37, a man who had lived his brief life almost entirely upon the fringes of his feelings, a man who

suffered physical agonies during the greater part of that life such as few creative writers have known. Because of the very exquisiteness of his sensibilities he has been called ' insane ' by no less a person than that other *naturphilosophe* W. H. HUDSON. It is a judgment that will not stand, and it may be forgiven HUDSON, for who can read *The story of my heart*, or, indeed, any of the writings of the mature JEFFERIES without realising that here we are in the presence of that rare creature, the natural humanist of genius whose spirit is one with nature; to whom every leaf, every living thing is so meaningful and significant and to be at once and always interpreted to the rest of mankind not so fortunately endowed with opportunity or the gift to see and to appreciate. In disease, despair, and poverty, to the very last moment of his life RICHARD JEFFERIES laboured thus. It is this, the meaning and intention of his life, which brings him so close to the company of all readers of *Isis*. In the present volume of selections from his works HENRY WILLIAMSON, whose own spirit and writings and sympathies fit him so well for the task, helps to bring him nearer to us. RICHARD JEFFERIES will more than bear a close acquaintance. M. F. A.—M.

D.—*Medical science*

Cires, Enrique de. La proteinoterapie es Argentina el Dr. VILLAR —su vida y su obra. 184 p., frontispiece, 4 illus. Libreria y Editorial " El Ateneo," Buenos Aires, 1936. ISIS

Account of the medical career of CARLOS L. VILLAR, 1852-1907, who made pioneer studies in the Argentine on tuberculosis and non-specific protein therapy.

Gassicourt, le Dr. Cadet de. Les deux trousses ayant appartenu à ADOLPHE RICHARD, chirurgien des Hôpitaux de Paris (1822-1872). *Bulletin de la société française d'histoire de la médecine* 31, 188-89, 1937. ISIS

Goldman, Leon. War and science—RUDOLPH VIRCHOW. *Annals of medical history* 8, 558-61, 1936. ISIS

Klebs, Edwin (1834-1913). Obituary by PAUL ERNST. *Verhandlungen der Deutschen Pathologischen Gesellschaft*, 17. Tagung, 10 p., 1914. ISIS

Monteiro, Hernâni. O Professor JOÃO PEREIRA DIAS LEBRE (1829-1900). Subsídios para a história do ensino da anatomia na escola do Pôrto. *Arquivo de anatomia e antropologia* 17, 461-64, 543-65, 1936. ISIS

Morrison, Hyman. OTTMAR ROSENBACH, pioneer in the development

of the concept of funtional disease and functional diagnosis in internal medicine. *Annals of internal medicine* 11, 527-36, 1937. ISIS

Pazzini, Adalberto. La storia della medicina in Italia nell'ultimo cinquantennio. *Rivista di storia delle scienze mediche* 28, 251-59, 1937 (to be cont'd). ISIS

Sabin, Florence R. The contributions of CHARLES DENISON and HENRY SEWALL to medicine. *Science* 86, 357-64, 1937. ISIS

Shryock, Richard H. The early American public health movement. *American journal of public health* 27, 965-71, 1937. ISIS

Vannier, Léon. L'œuvre de PECZELY et le diagnostic des maladies par l'observation de l'iris. *Bulletin de la société française d'histoire de la médecine* 31, 178-86, figs., 1937. ISIS

XXth Century

B.—*Physical sciences and technology*

Vauclain, Samuel M. Mass production within one lifetime. 27 p. Newcomen Society, American Branch, 1937. ISIS

C.—*Natural sciences*

Cook, Melville T.; Otero, Jose I. With the cooperation of F. A. LOPEZ DOMINGUEZ and members of the staff. History of the first quarter of a century of the Agricultural experiment station at Rio Piedras, Puerto Rico. San Juan, Puerto Rico, Agricultural experiment station, bulletin 44, 123 p., 23 ills., 1937. ISIS

A history of the organization, staff, equipment, and scientific researches in tropical horticulture and agriculture, mainly concerned with soil, fertilizers, sugar, citrus fruits, vegetables, tobacco, cotton, papaya and minor tropical fruits, essential oils, butyric acid, insect pests of plants and animals, plant diseases, plant breeding, and agricultural economics. A complete bibliography of publications is included. C. A. K.

Henrick, James. Soil science in the twentieth century. *Advancement of science*, 233-48, 1936. ISIS

MacBride, E. W. MENDEL, MORGAN and genetics. *Nature* 140, 348-50, 2 fig., 1937. ISIS

Mitchell, Hugh C.; Duvall, Charles R.; Hinks, A. R.; Wordie, J. M. PEARY's journey to the Pole. *Geographical journal* 90, 164-68, 1937. ISIS

Further technical discussion of PEARY's observations for position. C. W. A.

D.—*Medical sciences*

Hurd-Mead, Kate Campbell. NATHALIE ZYLBERLAST-ZAND: Warsaw histologist. A review of her investigations, 1912-1936. *Medical life* 44, 252-54, 1937. ISIS

Rosengarten, A. G. A romance in research. A story on cancer research as it is being developed and conducted at the Lankenau hospital research institute. General magazine and historical chronicle, University of Pennsylvania, 12 p., 2 illus., October 1937. ISIS

Shastid, Thomas Hall. Tramping to failure. 503 p. Michigan, WAHR, 1937 ($ 4.00). ISIS

The very breezy and entertaining autobiography of Dr. THOMAS HALL SHASTID. The author's reminiscences of his days at Columbia, Harvard, Michigan and Vienna Universities are diverting and informative, and his recollections of famous personalities and of others less well known, are not less interesting. His pages are crowded with events, pages which are suffused by the joyful wisdom of the author's happy personality. As a failure, it seems to me that the " tramp " has failed lamentably, for no one can read this book without coming away from it felling that the " tramp " has indeed been a success. Apart from the interest that this book will have for physicians and others it contains a good deal of material that will prove useful to future historians of the period of which Dr. SHASTID writes so well, and there is even one item of great interest to the historian of physics and radiology. M. F. A.—M.

E.—*Alia*

Gray, George W. The advancing front of science. xiii + 364 p. New York, Whittlesey House, 1937 ($ 3.00). ISIS

A good popular account of recent advances in physics, astronomy, chemistry, and biology. M. F. A.—M.

PART II

HISTORICAL AND ETHNOGRAFICAL CLASSIFICATION

I.—ANTIQUITY

2.—EGYPT

Jéquier, Gustave. Le prétendu secret de la grande pyramide. *Chronique d'Egypte* 12, 147-52, 1937. ISIS

Against pyramid maniacs.

Ranke, Hermann. The art of ancient Egypt. 22 p., illus. New York, Oxford University Press, 1936 ($ 2.50). ISIS

The Phaidon Press of Vienna has long been renowned for the beauty of its publications in the field of the fine arts. To their reputation as publishers of books of beauty they may now add the achievement of a real miracle of publishing, for the volume here noticed is a large quarto containing 332 illustrations in rotogravure and 8 superlative plates in colour, together with an excellent introduction by HERMANN RANKE, and a geographical index showing the present location of the works illustrated, and all for the price of a short novel. The price of the volume is 7/6 in England and $ 2.50 in the United States. How it is possible to produce so magnificent a volume at so low a price is a question not too difficult to answer, the abiding marvel is that it has been done, and it is all very admirable.

Architecture, sculpture, painting, and applied art, are all well represented in the illustrations, and Dr. RANKE's introduction is at one and the same time an excellent account of the development of Egyptian art and a guide to the illustrative material. The book should find a place in every library.

M. F. A.—M.

Winter, John Garret (ed.). Papyri in the University of Michigan collection. Miscellaneous papyri. xviii + 390 p., 7 pl., 3 fig. (University of Michigan studies, humanistic series, 40—Michigan papyri, 3). Ann Arbor, University of Michigan Press, 1936. ISIS

Reviewed by WILLY HARTNER, *Isis* 27, 337-39, 1937.

3.—BABYLONIA AND ASSYRIA

Langdon, Stephen Herbert. Babylonian menologies and the Semitic calendars. vi + 169 p. (Schweich lectures). London, MILFORD, 1935. ISIS

Reviewed by CHARLES-F. JEAN, *Journal asiatique* 229, 671-73, 1936 (received Sept. 1937).

Unger, Eckhard. From the cosmos picture to the world map. *Imago mundi* 2, 1-7, 1937. ISIS

4.—GREECE

Lundmark, Knut. On Greek cosmogony and astronomy. Lund Observatory, historical notes and papers, no. 4, 36 p., 2 fig., 1937. ISIS

II.—MIDDLE AGES

6.—MIDDLE AGES (*generalities*)

Björck, Gudmund. Deux nouveaux manuscrits concernant la médecine du moyen-âge. *Janus* 41, 107-14, 1937. ISIS

1. GIOVANNI TORTELLI (d. 1466) *Historia medicinae*. 2. JAMERIUS: *Chirurgia* (q. v., *Intr.* 1, 654). G. S.

Hamilton, Stanley B.; Mellor, P. H. The English dwelling house before the TUDORS. *Transactions of the Newcomen Society* 16, 27-43, 7 fig., 1935-36. ISIS

Thompson, Daniel V. The materials of medieval painting. 239 p. London, ALLEN and UNWIN, 1936. ISIS

Reviewed by MARY CATHERINE WELBORN, *Isis* 27, 340-41, 1937.

Weindler, Friedrich. Volksmedizin in den Wandmalereien des deutschen Mittelalters. *Archiv f. Gesch. d. Med.* 30, 78-90, 5 fig., 1937. ISIS

Wickersheimer, Ernest. Epistola YPOCRATIS ad ALEXANDRUM de tempore herbarum. *Janus* 41, 145-52, 1937. ISIS

III.—ORIENTAL SCIENCE AND CIVILIZATION

8.—WESTERN ASIA (*including "The ancient East" in general*)

Ünver, A. Süheyl. Alt-türkische Medizin an Hand einiger Miniaturen und Dokumente. *Therapeutische Berichte* 14, 4 p., 5 fig., 1937. ISIS

Ünver, A. Süheyl. Quelques miniatures et documents concernant la médecine turque. *Tedavi klinigi ve laboratuvari* 6, no. 24, 6-9, 1936 (in Turkish with French translation). ISIS

Ünver, A. Süheyl. Rapport sur la médecine en Turquie. *Dirim*, 12, 4-7, 1937 (in Turkish with French translation). ISIS

9.—INDIA

Clark, Walter Eugene. Science. The legacy of India, edited by G. T. GARRATT, pp. 335-68. Oxford, Clarendon Press, 1937. ISIS

Mills, J. P. The Rengma Nagas. x + 381 p. New York, MACMILLAN, 1937 ($ 6.00). ISIS

One of a series of monographs on the social anthropology of the hill tribes of Assam, by a well known investigator and published by the Government of Assam. M. F. A.—M.

Müller, Reinhold F. G. Indische chirurgische Instrumente. *Archiv f. Gesch. d. Med.* 30, 91-7, 3 fig., 1937. ISIS

Müller, Reinhold F. G. Über die Entwicklung von Lehrbüchern indischer Medizin. *Archiv f. Gesch. d. Med.* 30, 47-61, 1937. ISIS

Vogel, J. Ph. Annual bibliography of Indian archaeology for the year 1935. Volume 10, xii + 161 p., 13 pl., 4 fig. Leyden, BRILL (1937). ISIS

The great value of this bibliography, every volume of which has been registered in *Isis*, need not be underlined. The present volume contains a note by B. C. LAW on "Publications relating to ancient Indian geography" (pp. 12-20). G. S.

10.—CHINA

Benedetti-Pichler, A. A. Microchemical analysis of pigments used in the fossae of the incisions of Chinese oracle bones. Analytical edition. *Industrial and engineering chemistry* 9, 149-52, 5 fig., 1937. ISIS

Fuchs, W. The Peking map collection. *Imago mundi* 2, 21, 1937. ISIS

Hée, L. van (S. J.). Algèbre chinoise. Query no. 70. *Isis* 27, 321, 1937. ISIS

Hummel, Arthur W. The terminology of science in China. *Isis* 27, 326-28, 1937. ISIS

Lattimore, Owen. Origins of the great wall of China. A frontier concept in theory and practice. *Geographical review* 27, 529-49, 1 fig., 1937. ISIS

Saussure, Raymond de. LÉOPOLD DE SAUSSURE (1866-1925). *Isis* 27, 286-305, 1 pl., 1937. ISIS

Biography of the historian of Chinese astronomy, with portrait, bibliography, and the letters he wrote to GEORGE SARTON.

Wong, K. Chimin; Lien-teh, Wu. History of Chinese medicine. Being a chronicle of medical happenings in China from ancient times to the present period. Second edition, xxviii + 906 p., frontispiece, 53 pl., 14 fig. Shanghai National Quarantine Service, 1936. ISIS

Reviewed by WILLY HARTNER, *Isis* 27, 341-42, 1937.

11.—JAPAN

Ramming, M. The evolution of cartography in Japan. *Imago mundi* 2, 17-21, 1937. ISIS

Sakanishi, Shio. Prohibition of import of certain Chinese books and the policy of the Edo government. *Journal of the American oriental society* 57, 290-303, 1937. ISIS

"The Edict of Kanei in 1630 forced Japan to close her door to cultural and intellectual contact with the rest of the world. The proclamation of Teikyô in 1685 still further isolated her. A quarter of a century later, however, YOSHIMUNE's love of learning caused the government to adopt a more lenient policy toward scientific works, a policy which was maintained till the latter half of the 19th century. Looking back we see that the prohibition of the importation of foreign books hindered to some extent the development of Japanese science, but perhaps for two centuries it gave to Japan an opportunity for concentration on, and formulation of, her own culture."

Sakurai, Joji. Beginnings of Western science in Japan. *Nature* 140, 205-06, 1937. ISIS

12.—ISRAEL

(*Including works devoted to Palestine*)

Harris, H. H.; Harris, T. N. Pulmonary pathology in the Talmud. *Annals of medical history* 8, 553-57, 1936. ISIS

Roth, Cecil. A further note on the astronomers of the VECINHO family. *Jewish quarterly review* 28, 157, 1937. ISIS

Singer, Charles. The Christian approach to Jews. With a foreword by The Rt. Revd. The Lord Bishop of Chichester and a preface by H. W. FOX. 30 p. London, ALLEN, 1937. ISIS

Admirable statement which does credit to the author and to the British Christian Council for international friendship, life and work. G. S.

13.—IRAN

Bartholomae, Christian. Notes on Sasanian law, parts II and III. Translated from the German by L. BOGDANOV. *Journal K. R. Cama oriental institute*, no. 26, 3-73, 1934; no. 30, 103 p., 1936. ISIS

Inostrantsev, C. The views of Arabic authors on the Sasanian alphabet. *Journal K. R. Cama oriental institute*, no. 27, 48-54, 1935. ISIS

Markwart, Jos. The Navrōz, its history and its significance. Translated from the German by MANILAL PATEL. *Journal K. R. Cama oriental institute*, no. 31, 1-51, 1937. ISIS

Paruck, Furdoonjee D. J. The Persian calendars. *Journal K. R. Cama oriental institute*, no. 31, 52-80, 1937. ISIS

14.—ISLAM (*also Arabia*)

Bell, Gertrude. The earlier letters of. Collected and edited by ELSA RICHMOND. ix + 347 p., 8 pl. New York, LIVERIGHT, 1937 ($ 3.75). ISIS

These early letters of this famous interpreter of Arabian culture throw new light on her character and personality. They reveal her vivacity, her boundless interest in her expanding world, and her penetrating powers of interpretation of personalities. The period included, up to 1892, is

prior to her activities in archaeology, but covers her residence in Persia where she had her introduction to the Islamic civilization. Those who were charmed by her later *Letters* will enjoy these also. C. A. K.

Fischer, A. Über Finger-Zahlenfiguren bei den Arabern. *Islamica* 6, 48-57, 1934. ISIS

Hooper, David. Useful plants and drugs of Iran and Iraq. With notes by HENRY FIELD. Botanical series, Field museum of natural history, 9, no. 3, 73-241, 1937 ($ 1.50). ISIS

This is a very welcome addition to the growing collection of books on Islamic pharmacology. It is a kind of Islamic herbal. For each plant the Latin name is given, then the Persian and other names, a description and various remarks. After the plants (pp. 79-188), follows a few drugs of mineral origin (pp. 189-93) and of animal origin (194-99), all treated in the same way. Then follow prescriptions collected in Iran " At Isfahan Mirza MUHAMMAD ALI KHAN, ninety-five-year-old doctor, very kindly consented to dictate his prescriptions (pp. 200-216) for various ailments. He began to practice medicine at the age of twenty after spending about five years in a local school. His father, several uncles, and his grandfather were medical practitioners using the oral tradition and two large handwritten volumes of prescriptions, which I examined at his home in the depths of the labyrinthine Ghetto. At Isfahan the dictation in Persian was recorded by Rabbi JUDA HEDVAT of the Alliance Israélite." These prescriptions are reproduced in facsimile manuscript and translated. The book is completed with an alphabetical list of native names, which will be very valuable to students of Arabic and Persian MSS. The work seems to have been done with great care; however I noticed a slip (on p. 197) " The bezoar stone appears to have been first used as a medicine by the Arabian physician AVICENNA. RAZIS in his ' Continens ' describes it fully, and extols its good qualities as an alexipharmic." The second sentence contradicts the first. The bibliography included in the list of references is insufficient. For example, it does not refer to the valuable books of AHMED ISSA bey (Cairo 1930; *Isis* 20, 586), RENAUD and COLIN (Paris 1934, *Isis* 22, 277-79), or to MEYERHOF's publications. We are especially thankful for the writing of Persian names in Arabic script. G. S.

(Krachkovski, I. J.). Bibliography of the published works of IGNATII JULIANOVICH KRACHKOVSKI, member of the Academy of sciences of the USSR. Commemorating 30 years of his scientific activity, 64 p., port. Publications of the Oriental Institute, 19, Moscow, Leningrad, Acad. of Sc. USSR, 1936 (in Russian). ISIS

The name of the compiler of this model bibliography is not mentioned on the title page; the introduction reveals that J. S. VILENCHIK, assisted by V. I. BELYAYEV, compiled this book; both printed bibliographies and auto-bibliographical material were used. The bibliography lists the papers and books published between 1901 and the beginning of 1936, arranged

by years; in addition to 344 numbered principal items, it contains 85 contributions by KRACHKOVSKI to dictionaries, to works of other authors, etc. Most of these 429 items are annotated, giving references to reviews of the papers and books in various periodicals, specifying the nature or extent of K's contributions, etc. The bibliographical list of 429 items is followed by an annotated list of 48 bio-bibliographical items dealing with KRACHKOVSKI and his work. The printers deserve credit for their part in the making of this book; even the paper is good. A. P.

Sarton, George. Remarks on the study and the teaching of Arabic. Reprinted from the D. B. MACDONALD Presentation volume, pp. 333-47, Princeton 1933. ISIS

For the whole volume see *Isis* 21, 226. SARTON's article was reviewed by J. VILENCHIK in the *Bibliografia vostoka*, 10th issue (1936), 162-64, 1937 —that is, the " bibliography of the east " edited by the Oriental Institute of the USSR Academy of sciences. Professor VILENCHIK remarks at the end of his review : " SARTON's pamphlet is interesting for the reason that it shows that the old system of studying the Arabic language in America does not satisfy any more contemporary requirements. What would, indeed, happen if the teaching of the Russian language started with the ancient chronicles (*letopisi*), and the acquaintance with the contemporary Russian and Ukrainian languages were tolerated just for the sake of curiosity? At the present time, when the problem of preparing expert staffs—both theoretical and practical Arabists—has reached, with us, an especial importance, it would not be superfluous to think SARTON's suggestions over. It is possible that he let himself to be carried away : the study of live dialects is, of course, very useful, but it is not necessary, e.g., for the study of literature; SARTON's tendency to minimize the differences between the individual popular dialects (" the separate manners of speech of the popular language ") ought to be noticed. We must, however, warmly greet an attempt to combine the study of the Arabic East with a direct contact with live Arabs and with the living Arabic language." A comparison with Greek would be more adequate than that with Russian. I would not hesitate to claim that the teacher of Greek should know modern as well as ancient Greek. He is not obliged to know either the dialects or the λαλουμένη γλῶσσα of the uneducated people; he must however be familiar not only with the pure written language (ἡ καθαρεύουσα) but also with the literary aspects of the δημοτική i.e., both with the written and with the spoken language of the cultured modern Greeks. This answers VILENCHIK's objection. G. S.

IV.—NEW WORLD AND AFRICA

(*a*) AMERICA

Brown, F. Martin. America's yesterday. 319 p., illus. Philadelphia, LIPPINCOTT, 1937 ($ 3.50). ISIS

A delightfully and authoritatively written account of the early civilizations of North and South America. On the flap of the dust-jacked it is modestly stated that the book is intended for the "general reader," and without a doubt the "general reader" will find the book both fascinating and informing, but it might with equal truth have been added that student and scholar alike will find it not less so. The Inca, Maya, and Aztec civilizations of South America receive very full treatment, as does that of the North American Indians, and it is all so well done and so usefully ordered, that there can be nothing but admiration and gratitude to Mr. MARTIN for doing so well a so much needed to be done task. The many illustrations add greatly to the value and interest of a volume which is likely to play an important role in the education of Americans in the early history of the lands they have now made so peculiarly their own. M. F. A.—M.

Bushnell, David I., jr. Indian sites below the falls of the Rappahannock, Virginia. (*Smithsonian miscellaneous collections*, 96). v + 65 p., 11 fig. Washington, D. C. Smithsonian Institution, 1937. ISIS

Castetter, Edward F.; Bell, Willis H. The aboriginal utilization of the tall cacti in the American Southwest. University of New Mexico bulletin (*Ethnobiological studies in the American Southwest*, 4), Biological series 5, 48 p., 1937. ISIS

Cook, Sherbourne F. The extent and significance of disease among the Indians of Baja, California from 1697 to 1773. *Ibero-Americana*, 12. 40 p. Berkeley, University of California Press, 1937 (50 cents). ISIS

Important study quantitatively correlating marked decline in aboriginal population following advent of whites, with introduction of new diseases of great virulence. The area selected for study is noteworthy for absence of such complicating factors as warfare, alcohol, and interbreeding. In the 76 years, the Indian population declined from about 40,000 to 5,000. Possibly half of this decrease may be directly attributed to introduced epidemic diseases, chiefly syphilis. C. D. L.

Davidson, Daniel Sutherland. Snowshoes. 207 p. *Memoirs of the American philosophical society* 6, 1937. ISIS

A study of the distribution of the various kinds of snowshoes in North America. M.F.A.—M.

Eggan, Fred. Social anthropology of North American tribes. xvii + 456 p. University of Chicago Press, 1937 ($ 3.00). ISIS

Essays in Social organization, law, and religion presented to Professor A. R. RADCLIFFE-BROWN upon the occasion of his accepting the Chair of

Social Anthropology at Oxford University by eight of his former associates and students. The excellence of the individual contributions renders this volume a very valuable contribution to the ethnology of North America. M. F. A.—M.

Noll-Husum, Herbert. Grundlegendes zur Zeitbestimmung der Maya.—Eine Aufgabe der geschichtlichen Himmelskunde. *Zeitschrift für Ethnologie* 69, 53-63, 1937. ISIS

Speck, Frank G. Oklahoma Delaware ceremonies, feasts and dances. 161 p. *Memoirs of the American philosophical society* 7, 1937. ISIS

Including textual materials and their translations. M. F. A.—M.

(*b*) OCEANIA

Bateson, Gregory. Naven, a survey of the problems suggested by a composite picture of the culture of a New Guinea tribe drawn from three points of view. xix + 296 p., 28 pl. Cambridge, University Press, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 454-57, 1937.

Haddon, A. C. Reports of the Cambridge anthropological expedition to the Torres Straits. 6 vols. Cambridge University Press, 1901-35. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 349-53, 1937.

Harrisson, Tom. Savage civilization. 463 p. New York, KNOPF, 1937 ($ 4.00). ISIS

The author describes this book as a history of the New Hebrides in Melanesia. But the book is much more than the author modestly claims for it. In the first place, the author spent some two years living and attempting to identify himself with the aboriginal inhabitants of these islands, and in the second place he is actually much more interested in the natives themselves than in their history. He kept no notes during his sojourn among them, and began to write this book only after his return to England. The anthropologist cannot help but regret the fact that the author's interest in these people did not lead him to recognise the great value which his observations, systematically collected and presented, would have had for the anthropologist. Anthropologically the inhabitants of the New Hebrides are not well known. The posthumously published work of BERNARD DEACON (*Malekula, A vanishing people in the New Hebrides*, London 1934), a brilliant young student whose promising career was cut short by black-water fever, is the only valuable study on the region that we at present have. What Mr. HARRISSON tells us of the native cultures but whets our appetite, but,

alas, the main dish is not forthcoming. Mr. HARRISSON is a very young man, and naturally he has too many heads to belabour (not excepting that of an occasional anthropologist) to bother about such things as a systematic account of the native cultures in which he is obviously sincerely and deeply interested, but since the heads, are most of them deserving of Mr. HARRISSON's attentions, we cannot complain too much.

Mr. HARRISSON's energetic account of the impact of white contacts upon the natives is extremely well done, and students of society interested in acculturation will find some illuminating material here. Certain of the figures who have played an important role in the New Hebrides, to whom our author sometimes does much less than justice, were worthy of more attention than Mr. HARRISSON devotes to them. Outstanding among these is that remarkable character, JOHN G. PATON, the Presbyterian missionary to the New Hebrides, whose autobiography, edited and published by his brother JAMES (*John G. Paton, Missionary to the New Hebrides*, 1824-1907, London & New York, 1907), is one of the most fascinating, revealing, and important books of its kind. Mr. HARRISSON devotes very little space to PATON and his amazing experiences, in so doing he has strangely neglected to advantage his book and his readers with the story of a very remarkable life. This is all the more surprising since PATON is just the sort of material upon which Mr. HARRISSON's book is built. M. F. A.—M.

(*c*) AFRICA (*outside Egypt and Islam*)

Frobenius, Leo; Fox, Douglas C. African genesis. 236 p. New York, STACKPOLE, 1937 ($ 3.75). ISIS

This is a very loosely put together collection of Berber, Sudanese, and Rhodesian legends and folktales, apparently translated from the German, for the feeling and style of the originals have quite obviously not been preserved in the translations. Nonetheless, these folk-tales are extremely interesting in themselves. Whether some of these tales serve to explain the meaning of certain of the rock-carvings which are figures in the text the reader may best be left to judge for himself. The full page portraits are very attractively done, and apparently represent the narrators of some of the tales included in the volume, but unfortunately there are no legends further descriptive of the figures in these portraits. M. F. A.—M.

Joleaud, L. Les débuts de la domestication d'après la chronologie des gravures rupestres sahariennes. XVI^e^ Congrès international d'anthropologie et d'archéologie préhistorique, Bruxelles 1-8 septembre, 1935, pp. 929-38, 1936. ISIS

Leakey, L. S. B. Stone age Africa. An outline of prehistory in Africa. xii + 218 p. London, Oxford University Press, 1936. ISIS

Reviewed by G. JACOB-FRIESEN, *OLZ* 40, 657, 1937.

Nalder, L. F. A tribal survey of Mongalla Province. viii + 226 p. New York, Oxford University Press, 1937 ($ 2.50). ISIS

This work, the result of the collaborative efforts of the Province official staff and the members of the Church Missionary Society, is to be welcomed as a useful extension of SELIGMAN's *Pagan tribes of the Nilotic Suden.*

M. F. A.—M.

PART III

SYSTEMATIC CLASSIFICATION

I.—SCIENCE IN GENERAL

16.—HISTORY OF SCIENCE

Artelt, Walter. Die Institute für Geschichte der Medizin und der Naturwissenschaft in Deutschland. 4. Das Institut für Geschichte der Medizin und der Naturwissenschaften in Berlin. *Mitteilungen zur Geschichte der Medizin, der Naturwissenschaften und der Technik* 36, 281-84, 1 fig., 1937. ISIS

(Cambridge, University of). *Isis* 27, 329-30, 1937. ISIS

Congrès international de l'histoire des sciences et techniques, IV^e^. Praha 22 au 27 septembre 1937. Programme officiel, 40 p. ISIS

Enriques, F.; Santillana, G. De. Compendio di storia del pensiero scientifico. vi + 481 p. Bologna, ZANICHELLI, 1937 (L. 20). ISIS

In 1932 the authors of the present compendium issued the first installment of their *Storia del pensiero scientifico* in which they dealt with the development, or rather the history of scientific thought in antiquity (*Isis* 23, 467-69); further volumes to be issued in the future will complete the work by bringing it up to modern times.

In the present work the authors have utilized their materials for the larger study by making them available in an easily readable form in one grand compendious presentation of the history of the scientific, philosophic, aesthetic, and religious thought from antiquity to modern times. The book claims to be no more than the compendium that it is, the reader therefore knows what to expect. There are simply written accounts of the outstanding contributors and their contributions to scientific thought, and

these are really rather well done being arranged in the order of date and birth of the philosophers concerned. Naturally, the volume has all the defects which appear to be inseparable from this kind of presentation; it has, however, many merits, and the chief of these is that in its brief analyses it does provide the general reader with information in an easily available and readable form relating to the history of scientific thought, more reliable and perhaps more successfully than any other work of the kind with which I am familiar. The book should enjoy a great success. There is a satisfactory bibliography and a good index. M. F. A.—M.

(Isis). Editorial board of *Isis*. *Isis* 27, 330-31, 1937. ISIS

Klebs, A. C. Moyens matériels de diffusion de la pensée scientifique. Démonstration d'une carte géographique (monde occidental connu au XV^e^ siècle). *Actes de la Société Helvétique des sciences naturelles*, 376-77, La Chaux-de-Fonds, 1931. ISIS

(Leiden). Leiden, Netherlands. Institute for the history of medicine, natural sciences and mathematics. By G.S., *Isis* 27, 328, 1937. ISIS

Picard, Emile. Discours et notices. viii + 363 p. Paris, GAUTHIER-VILLARS, 1936. ISIS

Reviewed by GEORGE SARTON, *Isis* 27, 342-44, 1937.

Sarton, George. Fiftieth Critical bibliography of the history and philosophy of science and of the history of civilization (to end of February 1937—with special reference to mathematics). *Isis* 27, 364-410, 1937. ISIS

" This fiftieth Bibliography contains about 265 items of which 44 deal with mathematical generalities. They have been kindly contributed by seven scholars belonging to four different countries."

Sarton, George. The history of science and the New Humanism. xx + 196 p. Cambridge, Mass., Harvard University Press, 1937 ($ 2.00). ISIS

New edition of the Colver Lectures (New York 1931, *Isis* 16, 451-55) and of the Elihu Root Lecture (Washington 1936) with an introductory essay " The faith of a humanist " (preface to vol. III of *Isis*), a new preface, and an index. G. S.

Sarton, George. The history of science and the problems of to-day.

30 p. (Carnegie Institution of Washington, Elihu Root lecture, suppl. publ. 20). Washington, ROBERTS, 1936. ISIS

Reviewed by JOHAN NORDSTRÖM, *Lychnos* 1, 331-34, 1936 (in Swedish).

17.—ORGANIZATION OF SCIENCE

(*Internal organization is meant, see* Isis 1, 195.
For external organization, national or international, see section 55)

Bawden, Arthur Talbot. Man's physical universe. xvii + 812 p., 368 illus. New York, MACMILLAN, 1937 ($ 3,50). ISIS

This book is intended as a survey of physical science for college students. We can only say that the students of those colleges in which this book is likely to come into use will be very fortunate indeed to be served by so admirable a *vade mecum* to the physical universe as man sees and uses it. Written as a contribution to the general or liberal education course, Professor BAWDEN has aimed at producing a text which is thorough without being too detailed, which is panoramic without being superficial, and which will be easily understood without reference to the specialist or the dictionary. In these aims the author has succeeded eminently well.

The book is written from a broadly humanistic viewpoint, and constantly the relations between the sciences and society are illuminated and given point by some apt illustration, and very appropriately the last 25 pages of the book are devoted to a very pertinent consideration of these relations. The illustrations are well chosen, and there is an excellent bibliography intended for practical use by the student. The book, in short, is a liberal education in itself, and the author is to be congratulated upon a difficult task usefully and superbly well achieved. The book is very well printed and produced, and it is a pleasure to see buckram coming more and more into use, at least in Macmillan books, for the binding of books in this country. M. F. A.—M.

Foster, Charles. One hundred years of science teaching in Great Britain. *Annals of science* 2, 335-44, 1937. ISIS

Lilge, Fritz. Science and education in National Socialist Germany. *Harvard educational review* 391-403, May 1937. ISIS

18. PHILOSOPHY OF SCIENCE

Sarton, George. Preface to Volume XXVII. Unification of good will. *Isis* 27, 211-15, 1937. ISIS

Westaway, F. W. Scientific method. xxi + 588 p. New York, CURL, 1937 ($ 3.75). ISIS

A new edition of a work which has established itself as one of the best

introductions and surveys of the methodology and principles of scientific investigation in the English language; the historical treatment of the material adds greatly to the value of the work for purposes of reference. For a previous edition of the same work, see *Isis* 4, 119-22. M. F. A.-M.

II.—FORMAL SCIENCES (knowledge of forms)

20.—MATHEMATICS

De Roover, Raymond. Aux origines d'une technique intellectuelle : La formation et l'expansion de la comptabilité à partie double. *Annales d'histoire économique et sociale*, nos. 44-45, 171-93, 270-98, 1937. ISIS

This is a very remarkable synthesis based on an abundant (apparently exhaustive) documentation. Though the purpose is primarily economic, I list this memoir under mathematics in order to attract to it the attention of historians of arithmetic; it contains valuable information concerning the history of double entry bookkeeping, the first traces of which appeared in Genoa c. 1340, in several European countries. Contents : 1. Les origines de la comptabilité commerciale au moyen âge; 2. Premières applications et diffusion de la comptabilité à partie double; 3. Les débuts de la comptabilité industrielle; 4. Orientation bibliographique. G. S.

Edwards, E. J. An illustrated historical time chart of elementary mathematics for senior and secondary schools, training colleges and universities. Five charts, thick cardboard, varnished. University of London Press, 1936. ISIS

Reviewed by C. T. DALTRY, *Mathematical gazette* 21, 237-39, 1937.

Gabriel, R. M. The history of mathematics : its relation to pupil and teacher. *Mathematical gazette* 21, 106-16, 1937. ISIS

Sarton, George. Extreme slowness of the introduction of elementary algebraic symbols. *Isis* 27, 328, 1937. ISIS

Wolff, G. The development of the teaching of geometry in Germany. *Mathematical gazette* 21, 82-98, 1937. ISIS

III.—PHYSICAL SCIENCES (knowledge of inorganic nature)

23.—ASTRONOMY

Collinder, Per. Statistical notes on the astronomers of antiquity. Lund Observatory, historical notes and papers, no. 6, 13 p., 3 fig., 1937. ISIS

"Some results are given below from a preliminary study of some ancient and modern sources as regards the migrations of astronomical science in Antiquity and variations in time of the flourishing of astronomy until the beginning of Moslim science. Special attention is paid to the connections with the Near East of classical astronomy and to some apparent rises and decreases in the astronomy of classical times."

Gundel, Wilhelm. Dekane und Dekansternbilder. Ein Beitrag zur Geschichte der Sternbilder Kulturvölker. Mit einer Untersuchung über die ägyptischen Sternbilder und Gottheiten der Dekane von S. SCHOTT. x + 452 p. (*Studien der Bibliothek Warburg*, 19). Glückstadt, AUGUSTIN, 1936. ISIS

Reviewed by WILLY HARTNER, *Isis* 27, 344-48, 1937.

Jeans, Sir **James.** The size and age of the universe. *Annual report of the Smithsonian Institution for* 1936, pp. 123-36, 1937. ISIS

Discourse delivered at the Royal Institution on Nov. 29, 1935. Reprinted by permission from *Nature* 137, no. 3453, Jan. 4, 1936.

Journal of calendar reform. 112 p. July 1937. World calendar association, 630 Fifth Ave., New York City. ISIS

Lundmark, Knut. Two early conceptions concerning the earth's hanging free in space. Lund Observatory, historical notes and papers, no. 3, 8 p., 1937. ISIS

Comparison of the independent views of ANAXIMANDROS and of JOB (26 : 7). G. S.

25.—CHEMISTRY, PHYSICO-CHEMISTRY, INDUSTRIAL CHEMISTRY

Boll, Marcel. L'atomistique. Les atomes et les molécules, structures électroniques, capillarité et osmose, les colloides, la catalyse. Exposé élémentaire. 136 p., 82 illus. (*Collection Hippocrate*). Paris, LE FRANÇOIS, 1934. ISIS

Reviewed by HÉLÈNE METZGER, *Archeion* 16, 238-39, 1934.

Britton, Hubert Thomas Stanley. Chemistry, life and civilization : a popular account of modern advances in chemistry. vii + 248 p., 29 pl. London, CHAPMAN and HALL, 1931. ISIS

Ellis, Oliver Coligny de Champleur. A history of fire and flame. xxiv + 436 p., 22 pl. London, SIMPKIN, MARSHALL, 1932. ISIS

Jaeger, Francis Mauritius. De ontdekkingsgeschiedenis der chemische elementen. Antwerp, Het Kompas, 1937. ISIS

Lowry, Thomas Martin. Historical introduction to chemistry. 3rd ed. xv + 581 p., 57 fig. London, MACMILLAN, 1936. ISIS

Noyes, William Albert; Noyes, W. Albert, jr. Modern alchemy. ix + 207 p., illus. Springfield, Illinois, THOMAS, 1932. ISIS

Poce, Mario. Alchimia e alchimisti. Tredici secoli di follie scientifiche e filosofiche. 266 p., ill. Rome, 1930. ISIS

Reviewed by GINO TESTI, *Archeion* 15, 278, 1933.

Potratz, Herbert A.; Ekeley, John B. A bibliography of Indium, 1863-1933. *Univ. Colorado studies* 21, 151-87, 1934. ISIS

Rassenfosse, André de; Guében, G. Des alchimistes aux briseurs d'atomes. 2e éd. 182 p. (Bibliothèque scientifique belge). Paris, HERMANN, 1936. ISIS

Reviewed by HÉLÈNE METZGER, *Archeion* 18, 281, 1936.

Rohr, Moritz von. Ein Beitrag zur Geschichte des optischen Glases. (Bis zur Eröffnung des Jenaer Glaswerks). *Nova Acta Leopold.* 2, 147-202, 1934. ISIS

Schmidt, Albrecht. Die industrielle Chemie in ihrer Bedeutung im Weltbild und Erinnerungen an ihren Aufbau, nach 25 Vorlesungen an der Johann Wolfgang Goethe-Universität. xxxix + 829 p. Berlin, DE GRUYTER, 1934. ISIS

Smith, Edgar Fahs (1854-1928). The EDGAR FAHS SMITH memorial collection in the history of chemistry. By T. L. D., *Isis* 27, 326, 1937. ISIS

Soddy, Frederick. The interpretation of the atom. xviii + 355 p., 20 pl. London, MURRAY, 1932. ISIS

Spada, Nicolò. Leggi veneziane sulle industrie chimiche a tutela della salute pubblica del secolo XIII al XVIII. 33 p. R. Deputazione di storia patria, Venezia 1930. ISIS

C. R. de GINO TESTI, *Archeion* 13, 278-79, 1931.

Sudhoff, Karl. Die Schriften des sogenannten BASILIUS VALENTINUS. Ein Beitrag zur Bibliographie der Alchemie. *Philobiblon* 6, 163-70, 8 fig., 1933. ISIS

26.—TECHNOLOGY

(*For mining, see* 32. *Geology*; *for industrial chemistry*; 25. *chemistry*. *See also Arts and Crafts under* 45).

Black, Archibald. The story of bridges. xvi + 226 p. London, McGRAW-HILL, 1936. ISIS

Blum, André. Les origines du papier, de l'imprimerie et de la gravure, illustrées de 80 gravures. 252 p. Paris, Editions de la Tournelle, 1935. ISIS

Reviewed by AXEL NELSON, *Lychnos* 2, 430, Uppsala 1937 (in Swedish).

Bobart, Henry Hodgkinson. Basketwork through the ages. xv + 174 p., illus. Oxford University Press, 1936. ISIS

Bojunga, R. G.; Feldhaus, F. M. Bereitung und Verwendung des Russes im Wandel der Zeiten. In der Jubiläumsschrift von AUGUST WEGELIN in Köln-Kalscheuren, 3 fig., 1937. ISIS

Russ bei den Chinesen (zur Herstellung der Tusche), bei VITRUVIUS und PLINIUS, im Mittelalter und in der Patent-Literatur. F. M. F.

Boumphrey, Geoffrey Maxwell. The story of the wheel. Illustrated by T. L. POULTON. 96 p. (The how-and-why series, 7). London, BLACK, 1932. ISIS

Boutaric, Augustin. Les grandes inventions françaises. iii + 405 p., 27 fig. (La troisième république de 1870 à nos jours...). Paris, Les Editions de France, 1932. ISIS

Reviewed by F. M., *Revue générale des sciences* 44, 348, 1933.

Boyer, Charles Shimer. Early forges and furnaces in New Jersey. xv + 287 p. Philadelphia, University of Pennsylvania Press, 1931. ISIS

Brown, Cecil Leonard Morley. The conquest of the air: an historical survey. 126 p., 8 pl. (World's manuals). London, Oxford University Press, 1927. ISIS

Chapelle, Howard Irving. The history of American sailing ships. With drawings by the author, and GEORGE C. WALES and HENRY RUSK. xvii + 400 p., illus. London, WALES and RUSK, 1935. ISIS

Clapperton, Robert Henderson. Paper. An historical account of its making by hand from the earliest times down to the present day. xvi + 158 p., illus., pl., facs. Oxford, Shakespeare Head Press, 1934. ISIS

Clowes, G. S. Laird. The story of sail. 148 p. London, EYRE and SPOTTISWOODE, 1936. ISIS

Reviewed by F. G. G. CARR, *Geographical journal* 89, 483-84, 1937.

Davy, M. J. B. Interpretative history of flight : a survey of the history and development of aeronautics, with particular reference to contemporary influences and conditions. 208 p., 31 pl. (Board of education, Science Museum). London, H. M. Stationery Office, 1937. ISIS

Reviewed in *Nature* 140, 637, 1937.

Davy, M. J. B. Lighter-than-air craft : a brief outline of the history and development of the balloon and the airship, with reference to the National Aeronautical Collection, and a catalogue of the exhibits. 112-32 pl. (Board of Education : Science Museum. Handbook of the collections illustrating aeronautics, 2). London, H. M. Stationery Office, 1934. ISIS

Dieterichs, Karl. Die Buchdruckpresse von JOHANNES GUTENBERG bis FRIEDRICH KÖNIG. 40 p., 43 fig. (Beilage zum 28. Jahresbericht der Gutenberg-Ges.). Mainz, Gutenberg-Gesellsch., 1930. ISIS

Reviewed by ERNST CROUS, *DLZ* 3, 769-70, 1932.

Dollfus, Charles ; Geoffroy, Edgar de. Histoire de la locomotion terrestre. Les chemins de fer. xiv + 376 p., ills. Paris, 1935. ISIS

Reviewed by PH. T., *Revue générale des sciences* 46, 703, 1935.

Eder, Josef Maria. Geschichte der Photographie. Vierte gänzlich umgearbeitete und vermehrte Auflage. Zwei Bände. xxx + 1108 p., 372 fig. Halle a.S., KNAPP, 1932. ISIS

Reviewed by ALDO MIELI, *Archeion* 15, 117-18, 1933.

Ellis, Oliver C. de C. A history of fire and flame. xxiv + 440 p., 20 pl. London, MARSHALL, 1932. ISIS

Evans, Arthur F. The history of the oil engine. A review in detail of the development of the oil engine from the year 1680 to the beginning of the year 1930. With illustrations and name index and an index of important patents. Foreword by Sir DUGALD CLERK. xviii + 318 p. London, LOW, 1932. ISIS

Feldhaus, F. M. Bleistifte schreiben Weltgeschichte. 54 p., 39 fig. Privatdruck zum 275jährigen Jubiläum der Bleistiftfabrik Staedtler in Nürnberg, 1937. ISIS

Eine kritische mit 134 Literaturstellen belegte Studie über den Rötel, die Stifte aus Blei, Silber und Kupfer, den Graphit-Stift und den Anilin-Stift. Die Bilder zeigen: Rötelzeichnung in einem Grab um 100 vor Chr., römischen Klemm-Halter für Rötel, Zeichnungen mit Metallstiften seit dem Jahr 1010, Zeichnungen von RAFFAEL, LEONARDO DA VINCI, TENIERS usw., Bleistifte aus verschiedenen Zeiten. F. M. F.

Feldhaus, F. M. Berühmte Kunstwerke in Kupfer-Treibarbeit. *Der Metallarbeiter* H. 7, 4 fig., Berlin 1936. ISIS

Die Freiheits-Statue zu New York (1886), Statue des Hl. BOROMÄUS ZU ARONA (1624), Arminius-Denkmal bei DETMOLD (1838/75), Herkules-Figur zu Kassel (1714/17), Denkmal für AUGUST DEN STARKEN in Dresden (1733/36), Quadriga auf dem Brandenburger Tor in Berlin (1789/91), Figur auf dem Schloss zu Braunschweig (1858/63), Denkmal für TILLY am Lech usw. F. M, F.

Finch, William Coles. Watermills and windmills. A historical survey of their rise, decline and fall as portrayed by those of Kent. 336 p., ills. London, DANIEL, 1933. ISIS

Forbes, Arthur. A history of the army ordnance services. 3 volumes. London, Medici Society, 1929. ISIS

Freund, Gisèle. La photographie en France au dix-neuvième siècle; essai de sociologie et d'esthétique, 24 photographies. 154 p. 1936. ISIS

Reviewed by HÉLÈNE METZGER *Archeion* 18, 297-98, 1936.

Gibb, Sir Alexander. Research in engineering. *Advancement of science* 151-60, 1937. ISIS

Historical sketch as regards Britain and U. S. A. C. W. A.

Harlow, Alvin Fay. Old wires and new waves : the history of the telegraph, telephone, and wireless. xiv + 548 p. New York, Appleton-Century, 1936. ISIS

Reviewed by HARRY J. CARMAN, *American historical review* 43, 93-4, 1937.

--atfield, Henry Stafford. The inventor and his world. v + 269 p. London, KEGAN PAUL, 1933. ISIS

Hering, Daniel Webster. The lure of the clock. An account of the James Arthur Collection of clocks and watches at New York University. xiv + 121 p., 12 pl. New York, New York University Press, 1932. ISIS

Hill, William Henry (1857-1927); **Hill, Arthur F.**; **Hill, Alfred Ebsworth.** The violin-makers of the GUARNERI family, 1626-1762. Their life and work. Introductory note by EDWARD J. DENT. xxxvii + 181 p., pl. London, HILL, 1931. ISIS

Jenkins, Rhys. Links in the history of engineering and technology from Tudor times. Being the collected papers of RHYS JENKINS, M. I., Mech. E. Comprising articles published by him in the professional and technical press mainly prior to 1920 and a catalogue of his other published works. x + 248 p., 7 pl., 26 fig. Cambridge University Press, 1936. ISIS

Reviewed by E. A. FORWARD, *Antiquity* 11, 244-45, 1937.

Johannsen, Otto. Die Geschichte der Textil-Industrie. 543 p., 514 fig., 1 pl. Zürich, FÜSSLI, 1932. ISIS

Kirby, Richard Shelton ; Laurson, Philip Gustave. The early years of modern engineering. xvi + 325 p., 149 fig. New Haven, Yale University Press, 1932. ISIS

Koelner, Paul. Die Safranzunft zu Basel und ihre Handwerke und Gewerbe, im Auftrage des Zunftvorstandes verfasst. xi + 684 p., 12 pl. Basel, SCHWABE, 1935. ISIS

Reviewed by A. BRUCKNER, *DLZ* 57, 766-68, 1936.

Laufer, Berthold. The early history of felt. *American anthropologist* 32, 1-18, 1930. ISIS

Reviewed in *T'oung Pao* 28, 175, 1931.

Márquez Miranda, Fernando. Ensayo sobre los artífices de la platería en el Buenos Aires colonial. 235 + lxxvii p., 10 láminas (Publicaciones del Instituto de Investigaciones históricas de la Facultad de filosofía y letras de Buenos Aires, 62). Buenos Aires, Imprenta de la Universidad, 1933. ISIS

Reviewed by A. QUINTANA Y MARÍ, *Archeion* 16, 433, 1934.

Marshall, C. F. Dendy. The germs and development of some mechanical inventions. *Transactions of the Newcomen society* 16, 1-26, 12 fig., 1935-36. ISIS

Murphy, Charles J. V. Parachute. viii + 275 p. London, PUTNAM 1930. ISIS

O'Dea, W. T. Science Museum, South Kensington. Handbook of the collections illustrating electrical engineering. 1 : Electric power. Part 1 : History and development. 78 p., 19 pl. Part 2 : Descriptive catalogue. 96 p., 19 pl. London, H. M. Stationery Office, 1933. ISIS

Passmore, John B. The English plough. 84 p., 13 pl. (Reading University studies). Oxford University Press, 1930. ISIS

Reid, James. The evolution of horse-drawn vehicles. With historical notes chronologically arranged and compiled. 109 p., pl. London, Institute of British Carriage and Automobile Manufacturers, 1933. ISIS

Schroeder, Alf. Entwicklung der Schleiftechnik bis zur Mitte des 19. Jahrhunderts. viii + 191 p., 153 fig. Diss. BRAUNSCHWEIG, 1930. ISIS

Sherrington, Charles Ely Rose. A hundred years of inland transport, 1830-1933. 376 p. (DUCKWORTH's 100 years series). London, DUCKWORTH, 1934. ISIS

Staedtler, J. S. (firm). 275 Jahre Staedtlerstifte, 1662-1937. 80 p., 49 fig. Nurnberg 1937. ISIS

Very elegant Festschrift celebrating the history of the famous Nuremberg concern devoted to the making of pencils. It includes a history of pencils by FRANZ MARIA FELDHAUS (a name which is a sufficient guarantee for scholars) and an abundance of illustrations. G. S.

Stone, George Cameron. A glossary of the construction, decoration and use of arms and armor in all countries and in all times. Together with some closely related subjects. x + 694 p., 875 illus. Portland, Me., 1934. ISIS

Sturt, George (1863-1927). The wheelwrights shop. Passages selected and edited by A. F. COLLINS. xii + 236 p. Cambridge, University Press, 1934. ISIS

Supf, Peter. Das Buch der deutschen Fluggeschichte. Vorzeit. Wendezeit. Werdezeit. 518 p., 463 fig. Berlin, KLEMM, 1935. ISIS

Westcott, G. F. Science Museum : South Kensington. Handbook of the collections illustrating pumping machinery. Part I : Historical notes. 103 p., 30 pl. Part II : Descriptive catalogue, 195 p., 23 pl. London, H. M. Stationery Office, 1932-33. ISIS

Wilbur, C. Martin. The history of the crossbow, illustrated from specimens in the United States national museum. *Annual report of the Smithsonian Institution for* 1936 ; pp. 427-38, 6 pl., 1937. ISIS

Winbolt, S. E. Wealden glass : the Surrey-Sussex glass industry (A. D. 1226-1615). ix + 85 p., ills., 14 maps. Cambridge, HOVE, 1933. ISIS

Reviewed by W. A. THORPE, *Antiquity* 10, 501-02, 1936.

IV.—BIOLOGICAL SCIENCES (knowledge of organic nature)

27.—**BIOLOGY** (*generalities*, " *natural history* ")

Bleuler, Eugen. Mechanismus-Vitalismus-Mnemismus. ii + 148 p. (Abhandlungen zur Theorie der organischen Entwicklung, hrsg. von H. SPEMANN, W. VOGT, B. ROMEIS, H. 6). Berlin, SPRINGER, 1931. ISIS

Brunelli, Gustavo. Le teorie sull'origine e l'evoluzione della vita, da DARWIN ai nostri giorni. 198 p. Bologne, CAPPELLI, 1933. ISIS

Reviewed by J. B. M., *Revue générale des sciences* 44, 685, 1933.

Carpenter, Geoffrey Douglas Hale. Mimicry. With a section on its genetic aspect by E. B. FORD. ix + 134 p. (METHUEN's monographs on biological subjects). London, METHUEN, 1933. ISIS

Reviewed in *Nature* 134, 235, 1934.

Föyn, Björn. Geschlechtsgebundene und geschlechtskontrollierte Vererbung. iv + 122 p. (Handbuch der Vererbungswissenschaft, hrsg. v. E. BAUR u. M. HARTMANN, 1). Berlin, BORNTRAEGER, 1932. ISIS

Reviewed in *Nature* 133, 235, 1934.

Francis, Clarence. A history of food and its preservation. A contribution to civilization. An address delivered before Princeton University on March 9, 1937, in the Cyrus Fogg Brackett lectureship in applied engineering and technology. 45 p. Princeton University Press, 1937. ISIS

Gause, G. F. The struggle for existence. ix + 163 p. Baltimore, WILLIAMS and WILKINS, 1934. ISIS

Reviewed by THOMAS PARK, *Quarterly review of biology* 10, 209-12, 1935.

Haldane, John Burdon Sanderson. The causes of evolution. vii + 235 p. London, LONGMANS, GREEN, 1932. ISIS

Reviewed by G. P. W., *Nature* 131, 709-10, 1933.

Haldane, John Burdon Sanderson. A dialectical account of evolution. *Science and society* 1, 473-86, 1937. ISIS

Haldane, John Burdon Sanderson. Die philosophischen Grundlagen der Biologie. 72 p. Berlin, Prismen-Verlag, 1932. ISIS

Kenealy, Arabella. The human gyroscope: a consideration of the gyroscopic rotation of earth as mechanism of the evolution of terrestrial living forms: explaining the phenomenon of sex: its origin and development and its significance in the evolutionary process. v + 313 p., 16 pl. London, BALE, Sons and DANIELSSON, 1934. ISIS

Reviewed in *Nature* 135, 1059, 1935.

Lewin, Kurt. Der Übergang von der aristotelischen zur galileischen Denkweise in der Biologie und Psychologie. *Erkenntnis* 1, 421-86, 2 fig., 1930-31. ISIS

Mayer, André. Encyclopédie française. Tome 4 : la vie. 582 p. Paris, Société de gestion de l'Encyclopédie française, 1937. ISIS

Reviewed by JOSEPH NEEDHAM, *Nature* 140, 664, 1937.

Meyer, Adolf. Krisenepochen und Wendepunkte des biologischen Denkens. viii + 62 p. Jena, FISCHER, 1935. ISIS

Reviewed by ALDO MIELI, *Archeion* 17, 498-504, 1935 (received April 1936).

Needham, Joseph. Order and life. The Terry lectures for 1935 delivered before Yale University. x + 175 p. Cambridge, University Press, 1936. ISIS

Reviewed by G. P., *Revue générale des sciences* 48, 80, and by G. R. DE BEER, *Nature* 138, 863, 1936.

Neiva, Arthur. Esboço historico sobre a botanica e zoologia no Brasil. De GABRIEL SOARES DE SOUZA, 1587, a 7 de Setembro de 1922. 143 p. S. Paulo, Soc. Impressora Paulista, 1929. ISIS

Oldekop, Ewald. Le principe de hiérarchie dans la nature et ses rapports avec le problème du vitalisme et du mécanisme. 100 p. Paris, VRIN, 1933. ISIS

Reviewed by PIERRE BRUNET, *Archeion* 15, 454-55, 1933.

Poulton, Sir Edward. The history of evolutionary thought as recorded in meetings of the British Association. *Advancement of science*, 1-23, 1937. ISIS

Regan, Charles Tate. Natural history. 896 p. New York, HILLMAN-CURL, 1937 ($ 6.00). ISIS

The best of the popular Natural histories, edited by the Director of the British Museum of Natural History, and supported by a distinguished board of collaborators. The articles are all clearly written, and there are over a thousand beautifully reproduced photographic illustrations and some sixteen plates in colour. I must record one important error in the section on *Primates*, by R. I. POCOCK, on p. 844, where it is stated of this Order that "The feet always have five digits and the hand also, except in one animal, the Potto, where the second digit is vestigial." But this, as

Mr. POCOCK must surely know, is not quite true, for the genus *Ateles*, a South American spider monkey group, have nothing but a vestige of the thumb left, and this is clearly shown in the photograph of the animal (*Ateles variegatus*) figured on p. 857! Similarly, in the African guerezas of the genus *Colobus*, the thumb cannot be said to exist for it is reduced to the size of a small pea. The book is delightfully produced and it really ought to be in every library. Just at present it is my young daughter's "favourite book." M. F. A.—M.

Schmid, Alfred. Biologische Wirkungen der Luft-Elektrizität. Mit Berücksichtigung der künstlichen Ionisierung. Beobachtungen, Versuche und Hypothesen von der Mitte des 18. Jhdts. bis zur Gegenwart. 135 p., 5 pl. Bern, HAUPT, 1936. ISIS

Schmucker, Theodor. Geschichte der Biologie. Forschung und Lehre. 296 p. Göttingen, VANDENHOECK & RUPRECHT, 1936. ISIS

Reviewed by NILS VON HOFSTEN, *Lychnos* 2, 551, Uppsala, 1937 (in Swedish).

Wolff, Gustav. Leben und Erkennen. Vorarbeiten zu einer biologischen Philosophie. 442 p. München, REINHARDT, 1933. ISIS

Reviewed by ALDO MIELI, *Archeion* 15, 287-89, 1933.

28.—BOTANY (*Agronomy, Phytopathology, Palaeobotany*)

Bois, Désiré G. J. M. Les plantes alimentaires chez tous les peuples et à travers les âges : histoire, utilisation, culture. Vol. 3 : Plantes à épices, à aromates, à condiments. iii + 289 p. (*Encyclopédie biologique*, 7). Paris, LECHEVALIER, 1934. ISIS

Reviewed in *Nature* 136, 663, 1935.

Brooks, Jerome E. Tobacco. Its history illustrated by the books, manuscripts and engravings in the library of GEORGE ARENTS, jr. Together with an introductory essay, a glossary and bibliographical notes. Volume I, 1507-1615. New York, ROSENBACH, 1937. ISIS

Chronica botanica. Edited by Fr. VERDOORN. Vol. 1, 447 p. Editorial and publishing office, P. O. Box, 8, Leiden, April 1935. ISIS

Reviewed by JOHN HENDLEY BARNHART, *Science* 82, 279, 1933.

Clark, H. O.; Wailes, Rex. The preparation of woad in England. *Transactions of the Newcomen Society* 16, 69-95, fig. 21-36, 1935-36. ISIS

Costantin, Julien. Aperçu historique des progrès de la botanique depuis cent ans (1834-1934). 185 p., 17 pl. (*Annales des sciences naturelles, botaniques*, 16). Paris, MASSON, 1934. ISIS

Reviewed by J. DUFRÉNOY, *Revue générale des sciences* 46, 346-47, 1935.

Edwards, Everett Eugene. A bibliography of the history of agriculture in the U.S. iv + 307 p. (U.S. Dept. of Agricult., miscell. publication no. 84). Washington, Gov. Print. Office, 1930. ISIS

Fincke, Heinrich. Handbuch der Kakaoerzeugnisse. Ihre Geschichte, Rohstoffe, Herstellung, Beschaffenheit, Zusammensetzung, Anwendung, Wirkung, gesetzliche Regelung und zahlberichte, dargestellt für Gewerbe, Handel und Wissenschaft. xvi + 568 p., 162 fig., 62 pl. Berlin, SPRINGER, 1936. ISIS

Heinricher, E. Geschichte des Botanischen Gartens der Universität Innsbruck. 36 p., 5 pl. Jena, FISCHER, 1934. ISIS

Horwood, Arthur Reginald; Noel, Charles William Francis. (Lord Gainsborough). The flora of Leicestershire and Rutland: a topographical, ecological, and historical account with biographies of former botanists (1620-1933). ccxcvii + 687 p., 36 pl. London, Oxford University Press, 1933. ISIS

Reviewed by E. N. M. T., *Nature* 133, 158-59, 1934.

Marzell, Heinrich. Volksbotanik. Die Pflanze im Deutschen Brauchtum. 195 p., pls. Berlin, Verlag d. Deutschen Arbeitsfront, 1935. ISIS

Maurizio, Adam. Geschichte der gegorenen Getränke. viii + 262 p. Berlin, PAREY, 1933. ISIS

Reviewed in *Nature* 133, 668, 1934.

Merrill, E. D. On the significance of certain oriental plant names in relation to introduced species. *Proceedings of the American philosophical society* 78, 111-46, 1937. ISIS

Niessen, Joseph. Rheinische Volksbotanik. Die Pflanzen in Sprache, Glaube und Brauch des rheinischen Volkes. Band I : Die Pflanzen in der Sprache des Volkes. 276 p. Band 2 : Die Pflanzen im Volksglauben und Volksbrauch. 341 p., 1 pl., 52 fig. Berlin, DÜMMLER, 1936-37. ISIS

Nissen, Claus. Botanische Prachtwerke. Die Blütezeit der Pflanzenillustration von 1740 bis 1840. 44 p., figs. Wien, REICHNER, 1933. ISIS

Reviewed by ZAUNICK, *Mitt. zur Gesch. d. Med. d. Naturw. u. d. Techn.* 34, 175, 1935.

Percival, John. Wheat in Great Britain. 125 p., 63 fig. Leighton, Shinfield, Reading, 1934. ISIS

Reviewed by E. CECIL CURWEN, *Antiquity* 8, 240, 1934; and by E. J. RUSSELL, *Nature* 134, 606, 1934.

Post, George E. Flora of Syria, Palestine and Sinai : a handbook of the flowering plants and ferns, native and naturalized, from the Taurus to Ras Muhammad and from the Mediterranean Sea to the Syrian Desert. Second edition, extensively revised and enlarged by JOHN EDWARD DINSMORE. Vol 2, xviii + 928 p., 5 pl. (American University of Beirut : Publications of the Faculty of Arts and Sciences, Natural science series, no. 1). Beirut, American Press, 1933. ISIS

Reviewed by W. B. T., *Nature* 134, 440, 1934.

Salmon, Charles Edgar. Flora of Surrey : being an account of the flowering plants, ferns and characeae, with notes on the topography, climate and geology, and a history of the botanical investigation of the county. Edited by WILLIAM HARRISON PEARSALL. 688 p. London, BELL, 1931. ISIS

Savoy, Emile. L'agriculture à travers les âges. Histoire des faits, des institutions, de la pensée et des doctrines économiques et sociales. I. Quelques problèmes d'économie sociologique. Prolégomènes. II. Première période : de HAMMOURABI à la fin de l'Empire romain. 2 vol., xvi + 667 p. ; xvi + 478 p. Paris, DE BOCCARD, 1935. ISIS

Reviewed by PIERRE BRUNET, *Archeion* 18, 291-92, 1936.

Schafer, Joseph. The social history of American agriculture. ix + 302 p. New York, MACMILLAN, 1936. ISIS

Reviewed by HARRY J. CARMAN, *American historical review* 42, 777-78, 1937.

Tilden, Josephine E. The algae and their life relations. Fundamentals of phycology. xii + 550 p., 1 pl., 257 figs. Minneapolis, University of Minnesota Press, 1935 ($ 5.00). ISIS

This is a comprehensive monograph of the genera of the algae, with a discussion of distribution, a geological timetable, a historical discussion of the hypothesis concerning the phylogeny of the algae, a classification based on the evolutionary development of pigment and food reserves, utility, food relations, and ecology. A useful bibliography of about 700 titles is included. C. A. K.

Vavilov, Nikolai Ivanovich. The problem of the origin of the world's agriculture in the light of the latest investigations. 10 p., map. Science at the cross roads, London, KNIGA, 1931. ISIS

Watson, James Anderson Scott; Amery G. D. Early Scottish agricultural writers (1697-1790). *Trans. Highland and Agric. soc. Scotland* 43, 60-79, 1931. ISIS

Zander, Robert. Handwörterbuch der Pflanzennamen und ihre Erklärungen. 2. Aufl., 468 p. Berlin, Gärtnerische Verlagsges., 1932. ISIS

29.—ZOOLOGY

Böhringer, Peter Hans. Das Wiesel, seine italienischen und rätischen Namen und seine Bedeutung im Volksglauben. 91 p. Zurich, LEEMAN, 1935. ISIS

Bolitho, Hector. The glorious oyster: his history in Rome and in Britain, his anatomy and reproduction, how to cook him, and what various writers and poets have written in his praise; collected together as an acknowledgment of the supreme pleasure he has given to all persons of taste since Roman times. With certain chapters edited by MAURICE BURTON. x + 203 p. London, KNOPF, 1929. ISIS

Reviewed by J. H. O., *Nature* 125, 406, 1930.

Fleitmann, Lida L. (Mrs. JOHN VAN S. BLOODGOOD). The horse in art. From primitive times to the present. Foreword by A. J. MUNNINGS. 112 illus., chapter head and tailpieces by EDWARD KING. xxii + 372 p., pl. London, Medici Society, 1931. ISIS

Francis, Eric Thomas Brazil. The anatomy of the salamander. With an historical introduction by F. J. COLE. xxxi + 381 p., 26 pl. Oxford, Clarendon Press, 1934. ISIS

Reviewed in *Nature* 136, 87, 1935.

Gould, Rupert Thomas. The case for the sea serpent. xii + 291 p. London, ALLAN, 1930. ISIS

Grant, Gordon. Greasy luck. A whaling sketch book. With an introduction by WILLIAM MCFEE. London, HOPKINSON, 1932. ISIS

Gruvel, Abel. La pêche dans la préhistoire, dans l'antiquité et chez les peuples primitifs. 232 p., 134 fig., 26 pl. Paris, Société d'Éditions géographiques, maritimes et coloniales, 1928. ISIS

Jacoby, Adolf. Von verschluckten Schlangen und Eidechsen. *Oberdeutsche Z. Volkskde.* 6, 13-27, 1932. ISIS

Jenkins, James Travis. Whales and modern whaling. 239 p. London, WITHERBY, 1932. ISIS

Joleaud, L. Le rôle des coquillages marins fossiles et actuels dans la magie berbère. pp. 150-74. (Homenagem à MARTINS SARMENTO). Guimaraes, Portugal, 1933. ISIS

Reviewed by J. HERBER, *Revue de l'histoire des religions* 109, 234-35, 1934.

Koch, Karl. Die Grossmeister und Schöpfer unserer deutschen Bienenzucht von NIKOL JACOB 1568 bis zur Gegenwart. Dargestellt in Bildern ihres Lebens, Schaffens und Forschens. iv + 198 p., figs. Berlin, PFENNINGSTORFF, 1931. ISIS

Reviewed by ZAUNICK, *Mitt. zur Gesch. d. Med.* 33, 336, 1934.

Kornitzer, Louis. Pearls and men. 254 p. London, BLES, 1935. ISIS

Lehtisalo, T. Beiträge zur Kenntnis der Renntierzucht bei den Yuraksamojeden. 180 p., 32 illus., 2 maps, 16 pl., Oslo, 1932. ISIS

Reviewed by KAI DONNER, *Journal of the Royal Asiatic Society*, 121-24, 1933.

Oppenheimer, Jane M. Historical introduction to the study of teleostean development. *Osiris* 2, pt. 5, 24 p., 1936. ISIS

Summary—The earliest recorded observations of teleostean development are found in ARISTOTLE. This investigator, interested principally in the natural history and spawning habits of fishes, succeeded in seeing many of the development changes which are macroscopically visible. There are few records of further investigations upon teleostean development before the eighteenth century, and even then the observations were meagre; BLOCH and CAVOLINI gave illustrated accounts of fish-eggs with inadequate descriptions of the embryonic processes. The most interesting contemporary contribution was that of JACOBI, who practised artificial fertilization.

At the beginning of the nineteenth century embryology was given an important impetus by DÖLLINGER's emphasis on the comparative developmental study of the vertebrates, which arose because of the transcendental notions then dominating anatomy. The first subsequent paper concerning fish development was by FORCHHAMMER; more important and influential contributions were made shortly after by VON BAER, RATHKE and RUSCONI. RUSCONI was sufficiently detached from Würzburg intellectually and geographically to correct some of the mistakes made by VON BAER and RATHKE, but his accuracy was not recognized because of the greater prestige of the Würzburg workers.

Towards the middle of the nineteenth century France became the center of embryological research. Here, as formerly in Germany, it was the outcome of anatomical transcendentalism. The principal contributions were those of VOGT and LEREBOULLET. LEREBOULLET was able to ignore homologies and to concentrate his attention on the mechanism of development because of CUVIER's antagonistic attitude to the concept of unity of plan. From a consideration of experimentally produced fish monstrosities, he came to the now accepted conclusion that the edge of the blastoderm is a dynamic center of embryo-formation. This important concept was overlooked until recently, however, because of the return to observational embryology which followed the furor consequent to the acceptance of the evolutionary doctrine.

Parkinson, John. The Dinosaur in East Africa. An account of the giant reptile beds of Tendaguru, Tanganyika territory. 192 p. London, WITHERBY, 1930. ISIS

Potter, Edwin S. Serpents in symbolism, art and medicine. XV + 85 p. Santa Barbara, Calif., privately printed ($ 3.00). ISIS

In this little volume Dr. POTTER shows that the Babylonian Caduceus,

the two twining serpents, are practically always used in place of the Aesculapian club with the single twining serpent, as the emblem of medical healing, whereas it is only the latter, the single twining serpent upon a single club which is the true emblem of the medical art.

In Babylonian mythology the Caduceus is associated with the god Ningishzida, who was held to be the source of the moisture of the earth. In later periods he was referred to as the 'Herald of the earth,' as the 'Messenger of the earth mother,' sometimes male, sometimes female, sometimes hermaphrodite. The wand around which the serpents are twined represents the tree of life. The Hellenic Hermes is also associated with the Caduceus in a later period of his evolution, and there can be little doubt that Moses' feat with a crook before the Pharoah derives from the Babylonian association, and often identification, of the wand and serpents with Ningishzida. Dr. POTTER neglects to notice this point. With respect to Hermes it has been claimed that he was a purely Hellenic creation, but this is much more than doubtful, and it seems to us that he represents rather an Hellenic translation of the Babylonian Ningishzida. We are not here dealing with convergence, but with diffusion and borrowing as a living process of cultural development. In illuminating this aspect of his subject it seems to us that Dr. POTTER has missed a great opportunity. It is in the extension of Ningishzida's function as a messenger of the gods that the Caduceus later became associated with the functions of commerce. Thus, Hermes or Mercury with whom the Caduceus is so often associated is for this extended reason regarded as the patron of merchants and traders. The single twined serpent of the medical emblem is actually derived from the Babylonian myth of the great Earth Snake, the Mother Goddess Ishtar, mistress, mother, and creator of mankind, the personification of fertility, and the source of all life. But it is only with the birth of the myth of Aesculapius that the symbol of the single twined serpent upon a club came to be associated with the medical art. But since in this myth two serpents were involved, one bringing the other to life again, it is a pity that only one serpent, the life-giving one was retained in the medical emblem. It was really very unfair to the patient, and it still is. However, one serpent it is, and one serpent we suppose, it must now remain.

Dr. POTTER's little book is a very welcome addition to the literature, and the further exploration of the subject with which it deals would make an excellent topic for a dissertation. The book is well illustrated, and there is an index. M. F. A.—M.

Pratt, Ambrose. The lore of the lyrebird. With a foreword by Sir COLIN MACKENZIE. 71 p. Sydney, Endeavour Press, 1933. ISIS

Russell, E. S. The behaviour of animals, an introduction to its study. viii + 184 p. London, ARNOLD, 1934. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 348-49, 1937.

Ticehurst, Claud Buchanan. A history of the birds of Suffolk. xi + 502 p., 18 pl. London, GURNEY and JACKSON, 1932. ISIS

Reviewed in *Nature* 131, 568, 1933.

Ünver, A. Süheyl. Quelques mots sur l'ancienneté de l'histoire du " Yogourt " chez les Turcs. *Tedavi klinigi ve laboratuvari* 6, no. 22, 3-6, 1936 (in Turkish with French translation). ISIS

Uvarov, Boris Petrovitch. Insects and climate. *Trans. entomological society of London* 79, 1-247, 1931. ISIS

Reviewed by RICHARD JOEL RUSSELL, *Geographical review*, pp. 170-72, 1933.

Vögele, Hans-Heinrich. Die Falknerei. Eine ethnographische Darstellung. x + 106 p., 99 fig. (Veröffentlichungen des Geographischen Instituts der Albertus-Universität zu Königsberg Pr.) Königsberg, NEUMANN-NEUDAMM, 1931. ISIS

Reviewed by JOSEPH DE SOMOGYI, *Journal of the royal Asiatic society* 227, 1933.

Weiss, Harry Bischoff. The pioneer century of American entomology. 320 p. New Brunswick, N. J., the Author, 1936. ISIS

Reviewed by L. O. HOWARD, *Science* 83, 523, 1936.

V.—SCIENCES OF THE EARTH

(implying knowledge of both organic and inorganic nature)

31.—GEOGRAPHY AND OCEANOGRAPHY

Coville, Alfred. The French committee for historical geography and history of geography. *Imago mundi* 2, 54, 1937. ISIS

The Humboldt society for the study of the history of geography and cartography. *Imago mundi* 2, 22, 1937. ISIS

Hyde, Walter Woodhurn. The great St. Bernard Pass and its Hospice. *Isis* 27, 306-20, 1937. ISIS

Nischer-Falkenhof, Ernst von. The survey by the Austrian general staff under the Empress MARIA THERESA and the Emperor JOSEPH II, and the subsequent initial surveys of neighbouring territories during the year 1749-1854. *Imago mundi* 2, 83-8, 1937. ISIS

Raisz, Erwin. Time charts of historical cartography. *Imago mundi* 2, 9-16, maps, 1937. ISIS

Thomas, Lowell. The untold story of exploration. With illustrations by KURT WIESE. xii + 333 p., 12 illus. New York, Garden City, 1937 ($ 1.00). ISIS

The author aims to fill in certain gaps in the recent literature of the history of exploration by BEAZLEY, J. N. L. BAKER, Sir PERCY SYKES, and ORTHWAITE. The twelve persons selected are representatives of widely different times and regions. They include CHANG K'IÉN (138 B. C.), the pioneer Chinese explorer of Central Asia, who opened the first silk route to Europe; the Bavarian MARCO POLO, HANS SCHILTBERGER, a Christian slave who described Moslem Asia of the 15th century; the first CRUSOE, JOAN FERNANDEZ, not JUAN, the Spanish pilot after whom CRUSOE's island was named, but a Portuguese youth cast away on the shore of West-Africa in the interest of geographical knowledge desired by Prince HENRY, the Navigator, in 1445; the German SCHMIEDEL, a soldier of the Spanish conquistadors in South America; old KINTHUP (1884) who proved that the Tsampo and the Brahmaputra are one and the same river; the hoyden English lass, MARY KINGSLEY, who became the veteran explorer of West Africa; and BERTRAM THOMAS of Arabia, designated as the greatest living explorer. The last four are all " explorers by sea "; they include PYTHEAS (300 B. C.), the Greek explorer, who ventured into the Atlantic as far as Cornwall, Kent, and Thule; the mendaceous Portuguese corsair, PINTO; Master BILL ADAMS, the English sailor, favorite and advisor of IYEYASU, the Shogun; the buccaneer, WILLIAM DAMPIER, who became a great explorer; and the romantic LAPÉROUSE (1785) whose mysterious disappearance was not solved until 1827 by the discovery of relics at Tucopia in the New Hebrides. The book is written in a dramatic style, is not documented, and presents an interesting selection of the lesser great in the field of geographical exploration. C. A. K.

Winterbotham, H. S. L. Mapping of the Colonial Empire. *Advancement of science*, 101-16, 1936. ISIS

Historical sketch as regards British Empire. C. W. A.

32.—GEOLOGY, MINERALOGY, PALAEONTOLOGY, MINING.

(*For palaeobotany, palaeozoology and palaeoanthropology, see respectively* 28. *botany*, 29. *zoology and* 39. *prehistory*)

Forbes, R. J. Das Bitumen in den fünfzehn Jahrhunderten vor DRAKE (300-1860). BITUMEN H. 1-6, 68 p., 11 fig., 1937. ISIS

33.—METEOROLOGY, CLIMATOLOGY AND TERRESTRIAL PHYSICS

Toussaint, R. Green flash in Greek and Latin literature. Query no. 71. *Isis* 27, 322, 1937. ISIS

VI.—ANTHROPOLOGICAL AND HISTORICAL SCIENCES
(Knowledge of man, past and present)

34.—ANATOMY

Brashear, Alton D. The controversy concerning the innervation of the teeth. *Journal of dental research* 16, 17 p., 1937. ISIS

35.—PHYSICAL ANTHROPOLOGY
(Anthropometry and races of man)

Adams, Romanzo. Interracial marriage in Hawaii. A study of the mutually conditioned processes of acculturation and amalgamation. xx + 353 p., 11 pls. New York, MACMILLAN, 1937 ($4.50). ISIS

Insular isolation, immigration controlled by economic necessities and legal restrictions, extreme racial contrasts, and a rather unusual degree of interracial toleration combine to render this sociological study of the results of intermarriage exceptionally opportune and one of peculiar importance. The doctrine and ritual of racial equality have from the first prevailed in Hawaiian society. Native Hawaiians, American and European whites, Porto Ricans, Chinese, Japanese, and Filipinos continue to intermarry in this island laboratory of races and thus to offer at present the phenomena of both anthropological and cultural mixtures.

The author's view is that a race relation cycle in the Hawaiian Islands is now nearing an end in some predestined form of racial configuration, toward which the several racial components are moving. Years of contact with this phenomenon enable the author to trace its history and analyse its processes during the critical period of its initiation. The author concludes that the people of Hawaii will become one race. However, in 1930 only about 13 per cent were hybrids and the Japanese, who form 40 per cent of the total population, have shown the least percentage of outbreeding and that mainly in the Okinawans, who do not speak Japanese, and among the low caste etas. C. A. K.

36.—PHYSIOLOGY (*human and comparative*)

Corner, George W. The hormone of the Corpus luteum. *Transactions of the Edinburgh obstetrical society* 61-80, 5 fig., 1937. ISIS

Hoff, Hebbel E.; Fulton, John F. The centenary of the first American physiological society founded at Boston by WILLIAM A. ALCOTT and SYLVESTER GRAHAM. *Bulletin of the Institute of the history of medicine* 5, 687-734, 6 fig., 1937. ISIS

37.—PSYCHOLOGY (*human and comparative*)

Adler, Mortimer J. What man has made of man. xiii + 236 p. New York, LONGMANS GREEN, 1937 ($ 3.50). ISIS

This book is sub-titled "A study of the consequences of Platonism and Positivism in psychology" and it is by one of the leaders of the new movement of Neo-Thomism of the University of Chicago. If any reader of *Isis* is interested in discovering how seriously that movement needs to be taken he could, I think, do no better than go to this book. M. F. A.—M.

39.—PREHISTORY

Hasse, F. L'identification des patins en os du mésolithique au moyen-âge. XVI[e] Congrès international d'anthropologie et d'archéologie préhistorique, Bruxelles, 1-8 septembre 1935, pp. 292-302, 1936. ISIS

Hasse, F. L'outillage de la chaussure préhistorique. XVI[e] Congrès international d'anthropologie et d'archéologie préhistorique, Bruxelles, 1-8 septembre 1935, pp. 287-91, 1936. ISIS

Ohlmarks, Åke. Quelques aspects de l'identification de constellations sur les rochers sculptés par rapport à l'histoire des religions. Lund Observatory, historical notes and papers, no. 9, 6 p., 1937. ISIS

Svenonius, Björn. Quelques essais d'identification de constellations sur les rochers sculptés en ostrogothie (Suède). Lund Observatory, historical notes and papers, no. 7, 16 p., 5 fig., 1937. ISIS

Tallgren, A. M. The Arctic bronze age in Europe. *Eurasia septentrionalis antiqua* 11, 46 p., 62 fig. (no date, received in August 1937). ISIS

40.—ETHNOLOGY

(*Primitive and popular science*)

Birket-Smith, Kaj. The Eskimos. xiv + 250 p. New York, DUTTON, 1936 ($ 5.00). ISIS

BIRKET-SMITH is an acknowledged authority on the Eskimos, among whom he has lived and starved for long periods of time, and whose purely scientific writings on the Eskimos have been a great boon to anthropologists. The present work on the Eskimos is from every point of view the best

available study on these people and their culture which has thus far appeared. There is a good historical account of the people and their culture followed by the formal description. There is a foreword by DIAMOND JENNESS, and the translation by W. E. CALVERT is excellent. The photographic illustrations are a valuable feature of the volume, there is a good index and a useful bibliography. Altogether a most valuable contribution to our understanding of the Eskimo. M. F. A.—M.

Thompson, Stith. Motif-index of folk-literature. A classification of narrative elements in folktales, ballads, myths, fables, mediaeval romances, exempla, fabliaux, jest-books, and local legends. Vol. 6, alphabetical index. 647 p. (Indiana University studies, 23), 1936. ISIS

This volume six contains an elaborate alphabetical index to the whole series (1932-36) for which see *Isis* 20, 607. These six volumes constitute a very precious tool for the folklorist. G. S.

Ünver, A. Süheyl. Folklores relatifs au traitement de la rage en Turquie. *Pratik doktor*, no. 9, 1936, pp. 3-5 (in Turkish, with French translation). ISIS

43.—SOCIOLOGY, JURISPRUDENCE AND POSITIVE POLITY

Leyburn, James G. Frontier folkways. x + 291 p. New Haven, Yale University Press, 1935. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 353, 1937.

Murdock, George Peter (editor). Studies in the science of society. xxii + 555 p. Yale University Press, 1937 ($ 6.00). ISIS

A volume of social studies presented by his students, friends, and admirers to ALBERT GALLOWAY KELLER in honor of the completion of his third decade as Professor of Science of society in Yale University. The twenty-six contributors to the volume have all taken the Ph. D. degree under Professor KELLER, and he must, indeed, feel a happy man in the contemplation of their offerings. There is at least one article in this volume which is bound to become a classic, but it would be invidious to single it out from among so many good things. Half the articles deal with problems of contemporary society, and the other half with problems relating to primitive cultures. The contents are: Editorial preface, G. P. MURDOCK; *Minority caricatures on the American stage*, H. E. ADAMS; *Basic realities in a system of unemployment benefit*, E. W. BAAKE; *Naturalization adjusts to the changing status of woman*, W. S. BERNAR; *The humor of primitive peoples*, H. A. BOWMAN; *Public provision for the blind*, C. G. CHAKERIAN; *The property rights of women in Puritan New England*, M. R. COBBLEDICK; *Social work in the light of social evolution*,

J. E. CUTLER; *The pattern of urban growth*, M. R. DAVIE; *The majority rule in collective bargaining*, H. M. DIAMOND; *The urbanization of the American Negro*, H. H. DONALD; *Enemy aliens: New Haven Germans during the World War*, H. W. ELDREDGE; *A sample comparative analysis of material culture*, C. S. FORD; *Shamanism in China*, E. D. HARVEY; *A survey of Indonesian civilization*, R. KENNEDY; *Marriage and the family among the Galician Ukrainians*, S. KOENIG; *Alternating generations in Australia*, W. E. LAWRENCE; *Freedom of the press: services of a catch phrase*, A. M. LEE; *The making of a black nation*, J. G. LEYBURN; *Frontier adjustment in South Africa*, J. LOBB; *Indo-Aryan society*, F. E. LUMLEY; *Primitive economics in the light of consistency in the mores*, N. MILLER; *Correlations of matrilineal and patrilineal institutions*, G. P. MURDOCK; *Names of American Negro slaves*, N. N. PUCKETT; *Statistical correlations in the science of society*, L. W. SIMMONS; *The fur trade frontier of Siberia*, T. C. WEILER; *The pre-Iroquoian cultures of New York state*, C. A. WOODS. M. F. A.—M.

44.—HISTORY OF CIVILIZATION

(General history, Historical methods, Biography and chronology)

Hayes, Carlton J. H. A political and cultural history of modern Europe. 2 vols. xviii + 863 p.; xiv + 1215 p. New York, MACMILLAN, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 357-58, 1937.

Kent, William (editor). An encyclopaedia of London. xii + 772 p. New York, DUTTON, 1937 ($ 2.50). ISIS

A most useful work not alone of reference, but for dipping into, concerning anything in any way relating to London. I don't suppose there is anyone alive who knows his London as well as Mr. KENT does, but it is one thing to know a town well, and quite another to write about it in a way which captures something of its atmosphere and conveys it to the reader. This, Mr. KENT has done eminently well, and the range of the information he gives is extensive, its quality sound. The book contains 16 illustrations, an excellent index, and a list of volumes for supplementary reading. M. F. A.—M.

Klibansky, Raymond; Paton, H. J. Philosophy and history. Essays presented to ERNST CASSIRER. xii + 360 p. New York, Oxford University Press, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU *Isis* 27 358-60 1937.

46.—HISTORY OF LANGUAGE, WRITING AND LITERATURE

Partridge, Eric. A dictionary of slang and unconventional English. xv + 999 p. New York, MACMILLAN, 1937 ($ 12.50). ISIS

As well as slang and unconventional English, however understood, this

remarkable dictionary, which deserves to rank with the greatest in any language includes the language of the underworld, colloquialisms, catch-phrases, solecisms, catachreses, nicknames, vulgarisms, Americanism which have become naturalised among Britishers, in short, the whole field of English other than standard and dialectical. It really seems incredible that a comparatively young man should alone and unaided, excepting for *ad hoc* occasional contributions from friends, have produced so immense a work. We can only admire the lexicologist's industry, and offer our gratitude to him for having produced a work which is a fit, nay, the fittest companion of the O. E. D. and which the modern reader will find indispensable. Improper terms are treated so antiseptically that the O. E. D. need have no qualms; indeed, it should be proud of the company of Mr. PARTRIDGE's volume. Mr. PATRIDGE's *Dictionary* displaces all volumes of a similar kind which have ever been written. It is a work of first-rate scholarship, and its long and lasting life is assured. M. F. A.—M.

VII.—MEDICINE

50.—HISTORY, ORGANIZATION AND PHILOSOPHY OF MEDICINE

Cohen, Jacques J. Psychotherapy. viii + 149 p. London, BALE, Sons and DANIELSSON, 1936 (5/0). ISIS

A criticism of current theories of psychotherapy, especially of Couéism, and an advocacy of psychophonism, a negation of the instinct of self-preservation. C. A. K.

Korns, Horace Marshall. Notes on the medical history of Vienna. *Annals of medical history* 9, 464-81, 1937. ISIS

Leclainche, Emmanuel. Histoire de la médecine vétérinaire. xv + 812 p. Toulouse, Office du Livre, 1936. ISIS

Reviewed by GEORGE SARTON, *Isis*, 27, 360-63, 1937.

Ocaranza, Fernando. Historia de la medicina en Mexico. 213 p., 22 illus., Mexico, 1934. ISIS

Interesting summary printed in Paris for distribution by the Midy laboratories, a well known French pharmaceutical concern. The booklet contains a good review of pre-Spanish Mexican physiological ideas, an analysis of the ancient materia medica, and an outline of aboriginal medical practices. The colonial period is discussed from the standpoint of epidemics, medical instruction, bibliography, and establishment of hospitals. The discussion of medicine in Mexico since independence of Spain is limited chiefly to the development of the School of medicine in the National University. There is a short bibliography. C. D. L.

Ravitch, Michael L. The romance of Russian medicine. xiv + 352 p. New York, LIVERIGHT, 1937 ($ 3.00). ISIS

This is a very unscholarly and carelessly written book on Russian medicine; this is a pity for a good book on the history of Russian medicine is much to be desired. In the opening passage of the present volume the author tells us that he was disappointed to find " that most of the eminent compilers of the history of medicine seldom mentioned the development of Russian medicine. The names of PIROGOV, MENDELEIEV, METCHNIKOV and PAVLOV are referred to only occasionally." We can only wonder whether Dr. RAVITCH looked into such standard works as GARRISON or CASTIGLIONI. The volume fails to give any connected account of the development of medicine in Russia, and can hardly be regarded as a serious contribution to the subject. The author's brief biographical accounts of the various figures who played some part in the development of that field in Russia are very incomplete, and no one could gain a true notion of the real stature of many of these figures from Dr. RAVITCH's account of them. The illustrations, with the exception of the frontispiece portrait of the author, are very poorly reproduced, and although it is stated on the flap of the dustjacket that the book runs to 376 pages the reviewer was able to locate only 352 including the pages numbered in Roman numerals. The mystery was, however, solved when the count of the illustrations yielded the number 24, which when added to 352 gave the sum of 376 ! This is surely a unique method of counting the pages of a book. Biblio-pathologists please note. M. F. A.—M.

Trapp, Carl E.; Trapp, Mary C. Psychiatry in art. *Annals of medical history* 8, 511-17, 13 fig., 1936. ISIS

51.—EPIDEMIOLOGY, HISTORY OF SPECIAL DISEASES. PUBLIC HEALTH AND SOCIAL MEDICINE

Clerf, Louis H. Historical notes on foreign bodies in the air passages. *Annals of medical history* 8, 547-52, 1936. ISIS

Iff, Wilhelm. Beitrag zur Geschichte der Beckenhochlagerung. *Janus* 41, 153-66, 9 fig., 1937. ISIS

Seiffert, G.; Du Dscheng-Hsing, Dr. Zur Geschichte der Pocken und Pockenimpfung. *Archiv f. Gesch. d. Med.* 30, 26-34, 5 fig., 1937. ISIS

Sonnenschein, Robert. A brief consideration of the history of the development of mastoidectomy. *Annals of medical history* 8, 500-10, 1936. ISIS

Van Andel, M. A. De leproos in de plastische kunst. *Bijdragen tot de geschiedenis der geneeskunde* 17, 145-51, 6 fig., 1937. ISIS

Willig, Doris. Public health in Soviet Russia. *Medical life* 44, 197-225, 1937. ISIS

52.—HISTORY OF HOSPITALS, OF MEDICAL TEACHING AND OF THE MEDICAL PROFESSION. BALNEOLOGY, MEDICAL GEOGRAPHY

James, R. R. Licences to practise medicine and surgery issued by the Archbishops of Canterbury, 1580-1775. *Janus* 41, 97-106, 1937. ISIS

Napjus, J. W. De hoogleeraren in de geneeskunde aan de hoogeschool en het Athenaeum te Franeker (1585-1843). VII, JOACHIM FRENCELIUS. *Bijdragen tot de geschiedenis der geneeskunde* 17, 154-59, 1 pl., 1937 (cont.). ISIS

53.—PHARMACY. PHARMACOLOGY. TOXICOLOGY

Jacobs, Maurice S. The history of digitalis therapy. *Annals of medical history* 8, 492-99, 1936. ISIS

VIII.—EDUCATION (the methods of accumulating, imparting and diffusing knowledge)

56.—BIBLIOGRAPHY (*Methods, libraries*)

Butler, Pierre. An introduction to library science. xvi + 118 p. Chicago University Press, 1933. ($ 1.50). ISIS

Very interesting and stimulating little book which every librarian ought to read. The main discussion is contained in these chapters: 1. The sociological problem. The library's function defined for its implications to the community which is served. 2. The psychological problem. The readers' mental activities in finding, reading, and utilizing books. 3. The historical problem. The historic process whereby society has accumulated its store of knowledge in graphic records. 4. Practical considerations. An argument to show that librarianship has need of investigations in these fields, and that the profession will profit by their findings.

58.—CATALOGUES OF SECOND-HAND BOOKS ON THE HISTORY AND PHILOSOPHY OF SCIENCE

Many catalogues of second-hand books are so interesting and so full of valuable information that we shall henceforth register them in this section, together with other lists of a similar nature, such as catalogues of scientific

medals and prints. When applying to the publishers of these catalogues for a copy, please mention *Isis*.

Brill, E. J. Oriental literature of the large library of the late GABRIEL FERRAND, editor of the Journal asiatique. Dutch East India, geography, ethnography, religion, art, law, etc. No. 98, 96 p., 1302 items. Leiden, 1937. ISIS

Davies, H. W. Books including an unpublished holograph poem by ALEXANDER POPE; a Greek liturgical ms. with music; BACON'S essays, 1625; Herbals, medicine, etc., etc. No. 1, 66 p., 425 items. London N. 19, 21 St. John's Park (received Sept. 1937). ISIS

Davis and Orioli. Rare books on science and medicine, including mediaeval manuscripts, autographs of NEWTON, PASTEUR, FREUD, first editions of AGRICOLA, BOYLE, DESCARTES, GALENUS, GALILEO, GILBERT, JENNER, LAVOISIER, PARÉ, VOLTA, etc., and a remarkable series of first editions of VESALIUS. No. 78, 81 p., 667 items. London, W. C. 1, 37 Museum St. (received Sept. 1937). ISIS

Fiedler, Henry George. American natural history. Books and papers on the faunas and floras of North America, Central America and South America, American geology. No. 63, 48 p., 1743 items. New York, 89 Chambers St., 1937. ISIS

Fock, Gustav. Vergleichende Anatomie, Histologie, Ontogenie, Anthropologie. No. 712, 202 p., 5725 items (received Sept. 1937). ISIS

Goldschmidt, E. P. Important books in the history of science. Catalogue 45, 60 p., 212 items. London W. 1, 45 Old Bond St. (received Oct. 1937). ISIS

Goldschmidt, E. P. Mediaeval literature, including important reference works and books on the history of universities, educational theory, schoolbooks and five early writing books. List 26. 40 p., 208 items. London, W. 1, 45, Old Bond St. (received Sept. 1937). ISIS

Hoosier Bookshop. Miscellany. Americana, first editions, medicine, sociology and social experiments, miscellaneous. List 54, 208 items. Indianapolis, Indiana, 2242 Park Ave. (received in August 1937). ISIS

Hoosier Bookshop. Americana medica. List 55, 157 items. Indianapolis, Indiana, 2242 Park Ave. (received Sept. 1937). ISIS

Lier, R. New acquisitions : 1. Old medicine, incl. botany; 2. Early science, incl. astronomy, chemistry, electricity, mathematics, physics, optics, etc. 162 items. Florence (Galluzo), Via S. Felice a Ema, 1937. ISIS

Lier, R. Old medicine and science from 1482 to 1880, including first editions of important XIXth century scientifical works. No. 20, 32 p., 252 items. Galluzzo-Firenze, Via S. Felice a Ema, 1937. ISIS

Lier, R. Old science and medicine. No. 21, 40 p., 270 items. Florence, Via S. Felice a Ema, 1937. ISIS

Offenbacher, Emile. Médecine et sciences anciennes. No. 3. 17 p., 170 items. Paris, 10, rue Pasquier (received Oct. 1937). ISIS

Quaritch, Bernard. A catalogue of books and periodicals on all classes of zoology. No. 540, 120 p., 1595 items. London W. 1, 11 Grafton St. New Bond St., 1937. ISIS

Zeitlinger, H. Bibliotheca chemico-mathematica. Second supplement. I, II. Compiled and annotated. xii+396 p. London, SOTHERAN, 1937. ISIS

59.—MEMORIA TECHNICA

Isis no. 74 (vol. 27, 2, 206 p., 1 pl., 12 fig.). Bruges, 1937. ISIS

This no. is analyzed in the 52nd Critical Bibliography. Every previous number has been analyzed in previous bibliographies. G. S.

Critical Bibliography no. 52. *Isis*, vol. 28,...—..,1938 ISIS

This note is published at the end of our bibliography solely for the convenience of the scholars who cut out the whole or part of it, attach extracts to catalogue cards and classify them. By adding this note to the others they will be able to find rapidly whether this particular bibliography has been analyzed or not.

60.—ERRATA

Si quis Argi oculos habere posset eosque omnes diligentissime ac

accuratissime intenderet in singulos versus, multa tamen eum inter corrigendum effugerent.

ISIS

Vol. 15, 565. DELAUNAY, P., XV, 221, not 201.
596. Foot of col. 1; MEGASTHENES, not MENEGASTHES.
18, 610. WILLUGHBY, F., XVIII, 104, 106.
21, 650. HEATH, A. E., XIX, 293.
HEATH, T. L., XXI, 423, 545.
24, 552. DELAUNAY, C. E., XXIII, 282.
DELAUNAY, P., XXIV, 235.
27, 249, 1. 7 from bottom, read commemorated.
211, last line of first §, read to the advantage.

OSIRIS

Vol. I, 588, line 2. HASELDEN, not HASENDEN.

A few other misprints are not mentioned in these errata because they are too obvious to cause any error or confusion. I wish to express my thankfulness to the readers who take the trouble to make the abovementioned corrections in their set of *Isis* and the *Introduction*. I would advise them, after having accomplished that little task, to write their initials near mine at the bottom of this note to indicate that these and previous errata have been taken into account. G. S.

These and the previous errata have been corrected by...

Index of Authors Included in the Fifty-second Bibliography

The Roman figures followed by (1) or (2) refer to the centurial classification (Part I); thus Baumann, E.D., IV(2)B.C. means that a paper by Baumann is listed under fourth century B.C., second half.

The Arabic figures refer to the historical and to the systematic classifications (Parts II and III) which are subdivided in sections numbered consecutively from 1 to 60. For instance, Bartholomae, C., 13 indicates that a paper by Bartholomae is listed in section 13 (Iran); Adams, R., 35 indicates that a paper by Adams is listed in section 35 (Physical anthropology).

The symbols IV(*a*), IV(*b*), and IV(*c*) refer to the new sections on America, Oceania and Africa at the end of Part II. For instance, Bell, W. H., IV(*a*) indicates that a paper by Bell is listed in section IV(*a*), America.

November, 1937. FRANCES SIEGEL.

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R. C. Archibald (Providence, R.I.)
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